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QUARTERLY

OF THE

National Fire Protection Association

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87 MILK STREET, BOSTON, MASS.

EDITED BY THE SECRETARY

National Fire Protection Association.

87 Milk Street, Boston, Mass.

Active Members.

January 1, 1914.

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American Institute of Consulting Engineers.
American Institute of Electrical Engineers.
American Institute of Mining Engineers.
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Virginia Fire Prevention Association.
Western Actuarial Bureau (Fire).
Western Canada Fire Underwriters' Association.
Western Factory Insurance Association.
Western Sprinklered Risk Association.
West Virginia Inspection Bureau.
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Wisconsin Inspection Bureau.
Wisconsin State Fire Prevention Association.

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Reports on fires appearing in the Quarterly are copies of or extracts from written reports forwarded to the Association. This Association, as a body, is not responsible for the statements or opinions of any of its members.

Photo. by David Caldwell, Member N. F. P. A.

A river of "fire-water."

The Fire Hazard of Alcohol.

This photograph was taken about 9 o'clock on the evening of the burning of warehouse No. 2 B, of the Daviess County Distilling Company, near Owensboro, Kentucky, November 17th, 1911. The fire started about 6 p. m. The burning whiskey flowed down the ravine and out upon the surface of the Ohio river several hundred yards distant, continuing to burn.

The Quarterly

Vol. 7 January, 1914 No. 3

Protecting Public Documents. The new public records law, passed at the last session of the New York Legislature, is making public officers all over the State take notice of official bad habits that have long needed correction. The public records of a village, town, city or county are human documents, registering the real property, the individual and communal wealth, the education, the health, the character, and in great measure the public activities of the people. From the birth entry to the death certificate they follow the social and material progress of all, guarding with their mute evidence against invasion of property rights or personal honor. They link together all generations, giving us the heritage of the past, protecting our rights in the present, and transmitting to the future our wishes and our ways. Though made only of paper and ink, they are the true bulwarks of intelligent progress from age to age.

In every controversy involving property, money or personal reputation, public records are sought and appreciated. At other times they are taken as a matter of course, like the air and the sunlight. Yet its public records are the most valuable possession of any community—probably the only possession that, once lost, cannot be replaced.

The older countries of Europe have long appreciated and safeguarded their public records, but it is within only the past quarter of a century that any of our American states has awakened to its duty regarding its records. The Capitol fire in Albany in the spring of 1911, with its irreparable losses of valuable documents, shocked the state into action, and a Supervisor of Records was appointed to examine into the care, custody and condition of public records in all the civil divisions of the state. His report of the general indifference and neglect as to public records in the municipalities of the state resulted in the passage of the new public records law that compels every county, city, town, village and public body properly to keep

and safeguard its records, and provides a pecuniary penalty, *collectible from officials individually*, for neglect.

The new law orders that all records shall be written legibly in durable ink on well-made linen paper, and conveniently arranged, and that all record books shall be substantially bound; that adequate fireproof rooms, vaults, safes or other fire-resisting containers for records shall be provided at the expense of the civil division to which the records belong; and that all records shall be kept in the buildings where they are made and used, and at night put back into the safety containers provided for them. To the Division of Public Records, Education Department, is given the power to take and care for public records not properly taken care of, and to enforce all provisions of this salutary law.

* * * * *

A Disinterested Service. In establishing a number of free scholarships in the fire protection engineering course at the Armour Institute of Technology at Chicago, the Fire Underwriters' Association of the Northwest has done a very commendable and unusual thing. It is perhaps an action as devoid of selfishness as anything a business interest could do. It is one of the items of difficulty in attacking the problem of the fire waste that the technical schools have shown a very lagging interest in special education calculated to meet this problem. This is of course because educators themselves are not yet awake to its importance. The Armour Institute of Technology was the leader in establishing a course in fire protection engineering, after consideration of the use by students of the testing station of the Underwriters' Laboratories generously suggested by Manager William H. Merrill, himself always on the firing line of larger public effort in fire protection. The connection of Professor Fitzhugh Taylor, of Armour Institute, with the Laboratories as Consulting Engineer is a logical one, beneficial both to the Institute and the Laboratories.

That the Fire Underwriters' Association of the Northwest, on the initiative of President W. R. Townley, should now furnish free scholarships for this course, in a sense completes the disinterested connection between the fire insurance interests and the Institute. There is no branch of the engineering profession in which there is a greater opportunity for useful service than that for which these free scholarships are provided. We believe that none of the achievements of the Fire Underwriters' Association of the Northwest (which have been many) will stand more to its credit in future years than the action referred to. The men it assists in this manner will one day exemplify as living vouchers its foresight and public spirit.

* * * * *

Firemen in Theatres One of its services to the city of Philadelphia not the least in importance was the reorganization by the Fire Prevention Commission, of which our member, Powell Evans, is chairman, of the methods of the Philadelphia Department of Public Safety, respecting protection of the public in the theatres. In relieving the firemen

of regular theatre duty the Commission took no hasty nor ill-considered action. The methods of other cities were first carefully investigated. Fire Marshal J. S. Mallory, then secretary to the Commission, visited Boston, where through the courtesy of Fire Commissioner Charles H. Cole (President Boston Chapter N. F. P. A.), he was permitted to accompany the theatre detail of the Boston fire department one night upon its rounds and was impressed by the superiority of its methods.

Following the attack of the machine politicians of Philadelphia who are attempting to embarrass the Fire Prevention Commission, one of the charges against whom is the half truth that "the protection of the playhouses has been taken from the firemen and entrusted to stage hands and ushers," Director of Public Safety Porter has made public the report made to him by Fire Marshal J. S. Mallory. This report says that the old system of placing one fireman in each theatre during performances was useless, because it was regarded by the firemen as a merely perfunctory duty. The real way to prevent fires, the report says, is to make the theatres fireproof, to inspect them regularly, to make sure that the fire doors are in working order and to enlist the co-operation of the theatre owners. Therefore, the firemen have been taken off the service and fire boxes installed in each theatre. The theatres have also been instructed to make extensive alterations assuring greater safety to patrons. On this subject the report says:

An investigation of the safeguarding of lives and property in theatres from fire dangers revealed to the Philadelphia Fire Prevention Commission that there existed considerable overlapping of duty respecting these houses in several distinct divisions of public service with absolutely no co-operation nor exchange of information between them. It was further evident that many essentials were not covered by the divided responsibility and that uniform service was not accorded to all theatres.

The Fire Marshal, Bureau of Fire, Electrical Bureau, Bureau of Police and Bureau of Building Inspection each rendered service to the theatre, but withal, uninstructed firemen were found on duty in some, and not permitted to go into the auditorium part of the house; emergency fire-fighting apparatus was missing in places and frequently found in inoperative condition; crowded aisles and inadequate exits were noted, as was also the lack of fire drill generally among theatre employees.

In the existing 44 theatres, housing on an average of anywhere from 40,000 to 50,000 persons each performance, or from seven to ten million once annually, it was apparent how really necessary to the Philadelphia public were adequate safety measures uniformly devised and enforced. When the Fire Prevention Commission determined upon an investigation of conditions the members were aware that the conditions in some houses were not altogether favorable.

Since the detail to theatres was considered a perfunctory duty, men in the fire department only two or three days were sent there without instructions, and realizing they had no authority, for in many instances where they attempted to stop minor abuses they were relieved of the detail. Again, where a company had a crippled member, he was selected. And even if an able-bodied man of a company were selected, he did not make any rounds nor report in writing his presence at the theatre. Although but a trifle more than 50 per cent of the houses received this service—the number being 24 out of the 44 theatres, as defined under the State act—all of the more modern and high-class houses were numbered therein, and necessarily some of the oldest and poorest in construction, which drew audiences mainly of women and children, were without firemen.

There was no accounting for this lack of uniform service to all theatres. Nor could it be reasonably deducted why a theatre should have such service, if the same was not rendered to other places of public assembly, as well as to many large department stores, especially during the Christmas season.

It is obvious to all fair-minded people that a fire department, limited in numbers, can scarcely be called upon to furnish guards for all places having equal reason for their presence, as a theatre. And the first thought was to inquire of other cities as to their treatment of the situation. Many large cities were addressed, and several visited by the members of the commission. It was found that Boston met the problem in a way ideally suited to the circumstances existing in Philadelphia.

It was not surprising that the commission's detailed investigation as to conditions in the theatres revealed rotten hose, in some cases placed against the steam pipes; missing hose nozzles; dead chemical extinguishers, which should be recharged every year, and which had not in some instances been recharged since installed; fire doors installed to serve their purpose, which were defeated to this end by the removal from the tracks or by being blocked open by various obstructions such as furniture or rocks, the removal of weights, and in some cases where the doors were held back by the use of nails. Many other details of comparative minor importance, when not called upon to operate, but of vital importance in emergency due to fire hazard, were revealed by the inspection.

It was especially gratifying to note the co-operative spirit of the management of every theatre, when defects endangering life or property were set forth. The result has been that in the past year our theatres have improved both as to the means of safely removing their patrons in a quick, quiet, orderly manner, through additional exits, more modern fire escapes and towers, and also through the training of employees not engaged in dismissing the audience to handle the various private fire appliances to fight back the danger until the arrival of the fire department. In past years all theatres were required to have upon the stage a city fire alarm box, which for some unexplained reason was removed by the last administration. These boxes are being replaced upon the stages of theatres, and the first duty of the chief of the fire patrol is to give the alarm in the event of fire. The fire companies responding to the theatre box are under instructions to go to given stations, and under no circumstances to pass the theatre; this is arranged so there may be no crowding of apparatus or clanging of bells in the vicinity of the theatre, which might confuse the audience.

* * * * *

Gravity Tanks as City Water Supplies. The civic authorities in Victoria, B. C., recently requested that an independent connection be afforded from the water tanks supplying automatic sprinkler equipments so that in the event of an earthquake or the city water mains being out of commission the fire department would be able to connect with the various sprinkler tanks in the city and draft from them. The arrangement suggested was a four-inch down-pipe from the tank with a control valve just underneath the tank. The down-pipe was to extend to about eight feet from the ground and to be fitted with a siamese or three-way connection. Our members in Victoria who are familiar with the rules of the Association governing automatic sprinkler equipments were considerably disturbed by this request from the civic authorities, realizing that such action might jeopardize the water supply of the sprinkler property itself should a fire occur therein before the refilling of the tank after being emptied by the department. Correspondence

by our Victoria member Mr. John L. Noble with members in other cities in an effort to ascertain if such practice as that suggested by the Victoria authorities had ever been permitted, elicited an interesting letter from Mr. E. F. Mohrhardt, one of our San Francisco members, who stated that this sort of connection was required by the city of San Francisco at one time for a period of about six months. An ordinance requiring such connections was adopted November 15, 1906, very shortly after the great San Francisco conflagration of that year. This ordinance was, however, repealed May 29th of the following year, at which time there was a general revision of the San Francisco ordinances and an opportunity given to correct the faulty measures enacted immediately following the fire. Following is an interesting comment by Mr. Mohrhardt on such an arrangement:—

As you state, the quantity of water available in sprinkler tanks is of little value for general hose use. By taking an average of 15,000 gallons per tank under fifty pounds pressure at the street, due to height of building, and using a 300-foot length of 2½-inch hose with 1⅛-inch nozzle, the supply would give 187 gallons per minute or far less than one good stream and only last about eighty minutes. If longer lines were used they would be of no value. A fire engine taking suction from such tanks so as to give an increased pressure over that derived by pure gravity, would use up the entire supply of 15,000 gallons in about twenty minutes, at the rate of 700 gallons per minute; then it would have to leave and hunt a second tank. Twenty-minute hose service at the time of a big fire or conflagration, considering the large amount of water lost in effective use of hose lines, would be nil, but a sprinkler equipment utilizing the same amount of water might save the entire building from loss.

* * * * *

Measuring Stray Trolley Currents. The article published in the last QUARTERLY on the subject of fire hazards from trolley currents brought forth an interesting comment respecting the methods of measuring such currents by ordinary instruments from Mr. L. A. De Blois of our associate member the Du Pont de Nemours Powder Company of Wilmington, Del. Mr. De Blois' personal experience with these troublesome stray currents is interesting. He says:—

There is one point to which I would call attention, and that is that it is practically impossible to measure the flow of stray currents by the use of ordinary commercial ammeters, for the reason that while the resistance of these instruments is very low, it is still sufficient to cause part of the current which normally flows through the circuit in which it is inserted to be diverted elsewhere, consequently the readings obtained indicate only a part of the current that would normally flow, and are hence very misleading.

I might add that I had ample demonstration of this fact in some work done ten or twelve years ago for the Missouri-Edison Company of St. Louis. At that time we were greatly troubled with stray railway currents flowing not only on the lead sheathing of our underground cables, but even along the copper neutral wire of our underground three-wire, low-tension distributing system. It happened at the time that this neutral was grounded at six or seven points in various parts of the city, and even when a section of the cable was rendered "dead" by removing the fuses from the outside wires at both ends of the section, the linemen were troubled to find that the removal of the copper fuses on the neutral often produced a heavy arc. We found that the street railway current was entirely responsible for

this and estimated that we were carrying from 200 to 300 amperes all the time on this neutral conductor. The obvious remedy, which we put into effect, was to remove all ground connections but one near the main generating station, consequently we had no more difficulty from this source, although we continued to have electrolysis on the lead sheathing of the cables. This was largely obviated by insulating them from ground connection at the danger points. Bonding them to grounded conductors, such as the casing of manholes, was not beneficial, as the addition of a bond simply lowered the resistance of the circuit and induced more current to flow along the lead.

* * * * *

The Railway Fire Protection Association. As outlined in the July QUARTERLY, our Committee on Railroad Properties met in Chicago on October 7th and 8th last and promoted the organization of the Railway Fire Protection Association. Mr. F. H. Elmore had this to say in laying the matter of the proposed organization before the meeting:—

The National Fire Protection Association has been in the fight for years, gradually extending its influence for better conditions, and, through memberships in this body, many of the railroads have accumulated much valuable information and advice. Its work, however, must be general, and it has not been able to specialize on the railroad risk.

We, representing railroads, have perforce been satisfied with experience gained and ideas developed on our own lines, with occasional interchange of thought with some railroad neighbor. What more logical, therefore, to suppose than that a body of representatives of the railroads interested in fire protection and prevention would broaden the field of observation and experience? With such an idea formulated, after some time and thought, the Committee met during the National Fire Protection Association convention in New York, in May last, and began work.

We have presented to you the fruit of our endeavors as a basis for a simple working body whose possibilities for usefulness, in our opinion, are very great. We have ideas to interchange, standards to compare, experiences and practices to discuss. We can develop conditions and results which will not only be of benefit to the roads with which we are associated, but which will also help the work of the National Association.

As an active member of the National Association, we will have a voice in its deliberations and be able to show what interest and what part the railroads have in reducing the enormous fire waste of this country.

Can we not, through the experience of one or more of our members, benefit the majority and economize for them also? Such a reciprocal interchange must be of general advantage.

Will not the standardizing of methods of protection and prevention simplify and better the situation for all?

Will not our association of intelligent, enthusiastic workers in this great field have a most positive effect on the operation of railroads and the territory they traverse?

These are the thoughts that have led us together to-day, and from my experience of past accomplishments by those interested in the work, I feel that we are starting to make some new railroad history.

The organization was duly perfected and the following officers elected: President, F. H. Elmore, of the Southern Railway; vice president, P. Hevener, of the Rock Island Lines; secretary-treasurer, C. B. Edwards, of the Mobile & Ohio Railroad, Mobile, Ala. In addition to

an executive committee, committees on fire hazards, statistics and forms, fire-fighting organization and fire-fighting apparatus were appointed. Papers were read by Mr. E. B. Berry, Mr. Chas. N. Rambo, Mr. A. D. Brooks, Col. W. B. Dunn, Mr. Anson Murphy, Mr. B. S. Mace and Mr. P. Hevener—all associate members of the N. F. P. A.

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The Cleveland High Pressure Service. Our active member the Cleveland Inspection Bureau has issued a very attractive report upon the Cleveland high pressure fire service system, containing a map showing the location of the mains and some very interesting photographs of the interior and exterior of the pumping station and water throwing tests of the system. We are authorized by our member Mr. C. H. Patton, publisher of the report, to state that he will be glad to mail a copy of the same to any of our members especially interested.

* * * * *

Safety to Life. Chairman H. W. Forster, of our Committee on Safety to Life, reports that a very promising co-operative arrangement has been perfected between his Committee and the National Council for Industrial Safety, the principal organization now occupying the field in research of matters of safeguarding life in factories. Mr. R. W. Campbell, President of the National Council, has been elected an associate member of the N. F. P. A. and accepts service on our Committee on Safety to Life. At the same time the Chairman of our Committee, Mr. Forster, becomes a member of the National Council for Industrial Safety and assumes the chairmanship of its special committee on fire prevention.

* * * * *

New Thread Pitch Gauges. Something over a year ago a supply of special thread pitch gauges for measuring the threads of hydrant and hose couplings was purchased by the N. F. P. A. and distributed to members at cost. These were found so useful in the inspection of hose couplings and hydrant fittings and so helpful to members desiring to aid in the work of standardizing these fittings that the supply of the gauges, which required to be specially made, was soon exhausted. The Association has recently caused a small additional supply of these gauges to be manufactured and will be glad to furnish them to members at cost, 75 cents each. Orders for the same should be addressed to the Association.

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N. F. P. A. Publications. The bulletins recently issued by the Association covering Dwelling House Hazards and the Evil Shingle Roof have broken all records for popularity. Members throughout the States and the Dominion have been exceedingly generous in their purchase and distribution. The Canadian Conservation Commission, through

our member Mr. James White, assistant to the chairman, purchased and distributed 6,000 copies of the Shingle Roof Bulletin alone. Similar large orders from active and associate members were received. Many pleasing comments have been made since the issue of these publications in the columns of the press, the following graceful compliment being paid by our esteemed contemporary the *Engineering Record*:—

Commendation of efforts to reduce fire loss is not necessary at this late day, but a word is not uncalled for on the campaign which is being waged to bring home to the people at large the help they can give in bringing about a reduction in the total loss. The National Fire Protection Association is issuing a series of popular bulletins as the basis for this campaign. One entitled "Dwelling-House Hazards" tells how to prevent fires in the home; another, on "The Evil Shingle Roof," tells its story graphically, while a third, obviously intended for more restricted distribution, contains suggested programs for "Fire-Prevention Day." Those with experience in trying to carry a message to the public appreciate the difficulty of making an impression that will be translated into action or a habit of caution. Persistence is the chief factor of success in such work. The educational instruments that can be used are varied, but not the least are bulletins of the type here referred to.

Before this issue of the QUARTERLY reaches the members they will have received copies of four important new publications: (1)Specifications for Construction of a Standard Building, (2) Code of Suggested Ordinances for Small Municipalities (including abridged building code), (3) Suggested Ordinance regulating the use, handling, storage and sale of Inflammable Liquids and the Products thereof, and (4) a reprint of the Story of the N. F. P. A. with an up-to-date list of its available publications as an appendix.

The Last Thing He Did.

There had been a bad explosion in a powder mill, and the proprietor, who was away on a pleasure trip, hurried home to make an investigation as to the cause.

"How in the world did it happen?" he asked the foreman of the mill as he viewed the wreck. "Who was to blame?"

"Well, you see, sir," replied the foreman, "It was this way: Bill went into the mixing room, probably thinking of something else, and struck a match by mistake. He——"

"Struck a match!" exclaimed the proprietor in amazement. "I should have thought that would have been the last thing on earth he'd do."

"It was, sir," was the calm rejoinder of the foreman.

Public Education.

In beginning the season's work of public education our distinguished active member, the Canadian Manufacturers Association, was again a leader, practically duplicating the series of successful educational meetings in Canada inaugurated before the holidays a year ago. As before, Mr. E. P. Heaton of our Executive Committee was the moving spirit in this work, the admirable results being due largely to his energy and initiative. Valuable assistance was also rendered by Mr. W. Walker, Secretary of the Ontario Fire Prevention Association, which organization was formed subsequent to the campaign of last year. As in the campaign of a year ago, Secretary Wentworth was the speaker and was accompanied on the tour either by Mr. Walker or Mr Heaton. The first meeting occurred on November 26th at Hamilton, Ontario, taking the form of a noon luncheon under the auspices of the Canadian Club. The following day, in Toronto, a meeting was held in the afternoon in the audience chamber of the Toronto Board of Trade, under the auspices of which body the meeting was called. On Friday, the 28th, the Canadian Club of Montreal considered the question of the fire waste at a noon luncheon attended by about five hundred persons at the Windsor Hotel. The week's campaign closed at Ottawa on Saturday the 29th, with a splendid meeting under the auspices of the Canadian Club at the Chateau Laurier. This was also a noon luncheon, and was attended by many members of Parliament.

The Canadian Clubs are very important and influential institutions in Canada. They are organized in practically every city of importance and comprise in their membership the leading citizens in all walks of life, including the city, provincial and Dominion officials.

While in Toronto, Secretary Wentworth was the guest of the Insurance Institute at a special dinner given on the evening of November 27th. At this dinner Mr. Heaton also spoke, bringing before the Institute the work of the Ontario Fire Prevention Association, a local branch of which was formed at Ottawa with the help of Secretary Wentworth on the following Saturday. Previous to Secretary Wentworth's tour, as thus arranged, he spent Monday, November 24th, in Montreal as the guest of the Angus Shops of the Canadian Pacific Railway. In Mr. Wentworth's party were twenty or thirty business men, officials, underwriters and engineers of Montreal. The program at the shops was arranged by Mr. Lacey R. Johnson, General Superintendent. A demonstration of monitor

nozzle protection for the lumber yards of the shops was made, as indicated in an article in this issue of the QUARTERLY. A demonstration of the methods used to prevent hydrants from freezing was also made, following which the party made a tour of the shops and was entertained at luncheon in the dining hall where the regular lunch served to the working men of the shops was given. Secretary Wentworth delivered a brief address at the table. Attractive programs were printed for this occasion with the heading, "Every Day is Fire Prevention Day at the Angus Shops." Such courtesy and entertainment is unusual on the part of such corporations, and the Montreal members of the N. F. P. A. deeply appreciated the opportunities afforded by General Superintendent Johnson to familiarize themselves with the character of the fire brigade and the fire-fighting equipment of the great shops. An immense amount of water was thrown by the monitors as well as the yard hose, all of which was an expense, it being metered to the company by the city.

The result of this further campaign in Canada will undoubtedly be exceedingly beneficial to fire prevention work in the Dominion in quickening the interest of influential people and securing their support for the fire marshal bill now before the provincial parliament of Ontario for consideration.

On Tuesday, November 25th, following the visit to the Angus Shops Secretary Wentworth was a guest of Chief Tremblay of the Montreal fire department, visiting all the principal fire stations and making an inspection of the apparatus, which included a ride up Beaver Hall Hill in the big steam fire engine recently fitted with a gasoline tractor engine. Mr. W. E. Findlay, one of our leading members in Montreal, accompanied Secretary Wentworth on this tour of the Montreal fire stations, traveling with him also to Ottawa, on Saturday, where he assisted in the formation of the Ottawa branch of the Ontario Fire Prevention Association above referred to.

On the evening of Friday, November 28th, a round table dinner was given in Montreal by the Conference Committee of the Canadian Manufacturers Association, the Chamber of Commerce and other local organizations constituting that committee which was recently formed to consider fire hazards and fire prevention problems in Montreal. At this meeting Secretary Wentworth outlined the plans of the National Fire Protection Association for local chapter organizations, and, as indicated in another part of the QUARTERLY, such chapter formation is now under consideration in Montreal.

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Following his Canadian tour Secretary Wentworth spent the week of December 1st in New Orleans at the annual convention of our active member, the American Institute of Architects, renewing his acquaintance with the members of the Institute gathered at New Orleans from the local chapters throughout the country which had considered the subject of the fire waste when the tour was arranged for the secretary of the N. F. P.

A. last season. Secretary Wentworth had a place upon the program of the convention, reporting the details of his speaking tour before the chapters of the Institute and outlining the beneficial results, both to the Institute and the cause of fire prevention, that had accrued from such tour. At the final session of this convention the Institute elected as its new secretary-treasurer Mr. David Knickerbacker Boyd, of Philadelphia, whose energy and initiative as chairman of the Institute's Committee on Public Information made last year's fire protection campaign before the chapters possible. Mr. R. Clipston Sturgis, President of the Boston Chapter of the Institute and a Boston member of the N. F. P. A., was elected president of the Institute. This new administration promises great service to the cause of fire prevention. The remarkable ability and devotion of Mr. Boyd is sure to give the Institute a large and influential place among the special organizations of America.

On his way north, Secretary Wentworth was a guest of the Memphis Society of Architects at dinner the evening of December 6th, and spoke at a noon meeting in the rooms of the Business Men's Association, arranged under the joint auspices of that Association, the Memphis Credit Men, the Fire Insurance Club and other organizations. One of our Executives, Mr. Elliott Middleton, presided at this meeting, the success of which was largely due to his interest and activity.

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On December 11th and 12th Secretary Wentworth paid the long-promised visit to Winnipeg, where he was enthusiastically received by the commercial and underwriting bodies of that enterprising city. Negotiations for this visit were begun over a year ago by Mr. John B. Laidlaw, Chairman of our Canadian Committee, during a visit to Winnipeg. These negotiations were continued with the N. F. P. A. office by the officials of the Canadian Club and the Winnipeg Board of Trade, also by Hon. A. Lindback, Fire Commissioner of the Province, who succeeded in securing the assignment of the special dates of this visit while at Philadelphia in October attending the annual convention of the Fire Marshal Association of North America, of which he was president. Secretary Wentworth was given little opportunity for idleness during his short stay in Winnipeg. Arriving on the morning of the 11th, he was the guest of the Canadian Club at a noon luncheon attended by several hundred; at 4.30 p. m. he addressed a special meeting under the auspices of the Winnipeg Board of Trade which was largely attended; and was tendered a dinner in the evening at the Royal Alexandra Hotel by the members of the Western Canada Fire Underwriters' Association. Following the meeting at the Canadian Club he attended as the guest of the speaker the opening exercises of the Dominion Parliament. The following day, Friday the 12th, with the assistance of the Winnipeg members of the National Fire Protection Association (some thirty in number) he organized the Manitoba Chapter of the N. F. P. A., eleven new members being received at the meeting.

Returning to Boston by the way of Chicago, Secretary Wentworth was present at the organization of the Chicago Chapter of the N. F. P. A. on Monday, December 15th. He attended the dinner of the Chicago Chapter of the American Institute of Architects on Wednesday, following which he addressed the members of the Western Society of Engineers in their auditorium in the Monadnock Building. This meeting, beside the members of that body, was well attended by architects and members of the N. F. P. A. from the ranks of the engineers of our active member, the Underwriters' Laboratories, Inc.

Beside these meetings and journeyings Secretary Wentworth attended the Philadelphia Fire Prevention Congress during the week of October 13th in company with many of the influential members of our Association who were present and took part in the deliberations of the convention. Other meetings during the last three months at which the Secretary was a speaker were: Men's Club, Marblehead, Mass., October 27th; Worcester Manufacturers, Worcester, Mass., October 28th; annual meeting, Board of Trade, Westerly, R. I., November 4th; Board of Trade, Lowell, Mass., November 11th; banquet, Maine Association of Local Fire Insurance Agents, Auburn, Maine, November 12th; Boston Master Builders' Association, November 14th, and Men's Club, Newton, Mass., November 17th.

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One of our executives, Mr. Rudolph P. Miller, Superintendent of Buildings for the Borough of Manhattan, N. Y., beside his instrumentality in launching the proposed New York Chapter of our Association, has been taking an active part in fire prevention education in the metropolis. In October he gave a lecture on Fireproof Construction, illustrated by lantern slides, before the Alumni Association of the Mechanics Institute, New York.

As a celebration of Fire Prevention Day, Superintendent Miller assembled nearly the whole force of inspectors and clerks of his Bureau, approaching 200 in number, in the assembly room, where they were addressed by himself and by President Robert D. Kohn. It was a very representative gathering of the men who for many years have supervised the erection of buildings in the city that stands first in the world for massive and costly construction.

Superintendent Miller, addressing them, said it was his desire that the department should enter into the spirit of Fire Prevention Day, should try to realize the purposes for which it was set aside and should heartily co-operate with the authorities in its observance and in furthering the objects which the law is intended to achieve.

Primarily fire prevention began with the original construction of buildings, the Superintendent said; safe construction played an important part in staying conflagrations. He hoped the inspectors would do what they could to encourage public interest in fire prevention measures, as well as in good construction.

After some further remarks Superintendent Miller introduced President Kohn, who pertinently directed his remarks to that part of fire prevention which has to do with fireproof construction in the first instance. The greatest obstacle to be overcome was indifference, he said. Not alone on the part of the general public but also on the part of architects and builders, who had been indifferent to the great destruction going on, and to the need for a more general practice of fire prevention methods. Being insured, they seemed to feel that they needn't care. The great economic waste would continue, Mr. Kohn said, until architects and builders were made to care.

Misapprehension as to the cost of fireproof construction was another obstacle to be overcome. Mr. Kohn claimed that very little difference remained nowadays between the cost of fireproof and the cost of non-fireproof construction. He cited the case of a building which cost one hundred thousand dollars to build fireproof, which was only six thousand dollars more than if it had been built of non-fireproof materials. The smaller fire loss in European countries was owing, first to the greater care exercised by citizens, and, second, to the better average construction.

From this point Mr. Kohn went into interesting details in explanation of the wiser methods which are followed in the principal cities of Europe, and how our architects and builders, by exercising a little care over things which they may consider of minor importance, could work a great change for the better without really adding to the cost of construction. In conclusion, Mr. Kohn asked the inspectors to see what they, on their part, could do to make Fire Prevention Day a real fire-prevention day in New York.

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The indefatigable Mr. Powell Evans of Philadelphia, despite his arduous labors in planning and conducting the October Philadelphia Fire Prevention Convention, found time during the last quarter for considerable personal activity in the direction of public education. At the December meeting of the Philadelphia Foundrymen's Association he addressed that body on the subject of inspection of properties by uniformed members of fire departments, incidentally replying to the criticisms made of the work of the Philadelphia Fire Prevention Commission by political enemies of the present Philadelphia administration. In October he presented a paper before the American Society for Municipal Improvement at its session in Wilmington, Del., and addressed the Pennsylvania Industrial Welfare and Efficiency Conference at Harrisburg, Pa., on the general subject of fire prevention. He also prepared a paper for the January volume of the annals of the American Academy of Political and Social Science, also an article on fire prevention legislation for the Insurance News. Mr. Evans is a pleasing and impressive speaker who invariably makes a lasting impression upon the bodies before which he delivers addresses.

The Chairman of our new Committee on Safety to Life, Mr. H. W. Forster, delivered two important and helpful addresses in November.

On November 11th he talked to the student body at Swarthmore College on fire prevention, and on November 22d he spoke at the regular Saturday luncheon of the City Club at Rochester, N. Y. Mr. Forster is a zealous supporter of the idea of making the installation of sprinkler equipments mandatory under certain conditions. He expresses the belief that the enterprising city of Rochester will be the first to make such fire protection compulsory.

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Mr. F. M. Griswold, the untiring Chairman of our Committee on Standard Hose Couplings, presented the matter of the long and admirable service of his committee to the thirty-fourth annual meeting of the American Society of Mechanical Engineers. Mr. Griswold together with Mr. John R. Freeman, Mr. E. V. French, Mr. Albert Blauvelt, Mr. H. F. J. Porter, Mr. T. W. Ransom and Prof. Ira H. Woolson, all members of the N. F. P. A., constitute the Sub-Committee on Fire Protection of the Society of Mechanical Engineers. The report of this committee, presented by Mr. Griswold, was unanimouly accepted and approved by the convention, the result of which is to officially place upon its records an endorsement of the N. F. P. A. specifications as being "acceptable as standards" for the purposes indicated, such action marking the limit to which the Society may go in its approvals. In this action by the Society, Mr. Griswold feels that the culmination of the direct efforts of the Special Committee has now been achieved, and that it now only remains that those who have at heart the complete standardization of these important public utilities, should devote their personal energies to the acceleration of the momentum already imparted to the work, and in this respect much encouragement should come to them through the knowledge that the A. S. M. E. unanimously approved a resolution that each member of that society should personally take up the matter of standardization within the sphere of his influence, where non-standard conditions prevail.

Mr. Griswold, as chairman of the N. F. P. A. Committee, presented to the American Society a set of "demonstration threads," and a model board showing standard thread sizes for couplings of $2\frac{1}{2}$-3-$3\frac{1}{2}$ and $4\frac{1}{2}$ inches, as elucidating the specifications published, supplementing these with a copy of the group photograph of the original committee of four, which includes H. C. Henley, G. E. Bruen, C. H. Campbell and Mr. Griswold, with the autograph signature of each member.

These gifts to the Society are to be made a part of its Museum collection, and will thus remain a continuing record of the work of this special committee of the N. F. P. A.

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Following the annual convention of the Underwriters' Association of the Northwest an informal conference of field men and others interested in fire prevention work was held in the assembly hall of the Chicago Board of

Underwriters, bringing together the men who had come to Chicago to attend the convention. Thomas E. Gallagher, as chairman of the committee on publicity and education, called the meeting to order, and Frank M. Drake of Louisville, Vice President of the N. F. P. A. and chairman of the committee on fire prevention associations, was elected chairman. Mr. Drake made an address showing the importance of increasing the interest and co-operation of the companies and of the field men and of educating the men in the business and reaching the public on the plane of their own community life. Several questions of interest to the state fire prevention associations were brought up and discussed at length, the conference being very interesting and useful for its interchange of practical and effective ideas. In addition to the representatives of the state fire prevention associations present, E. R. Hardy, of New York, was present and contributed valuable information to the discussion.

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Vice President Frank M. Drake writes enthusiastically of the fire prevention meeting held in Owensboro, Ky., in November, stating that the public meeting in connection with the inspection of that city was the most successful ever held by our active member the Kentucky State Fire Prevention Association. The visiting members were entertained at dinner by the Owensboro Chamber of Commerce, the dinner being served by the Women's Auxiliary of the Y. M. C. A., thus identifying the occasion directly with the civic interests of the community. The local enthusiasm shown was due largely to the public spirit of the Secretary of the Chamber of Commerce, Mr. Geo. H. Cox, who participated in the speaking at the dinner. The newspapers of Owensboro, a city of about 20,000 inhabitants, devoted generous space to a sympathetic report of the efforts of our Kentucky members. It is obvious that Owensboro is somewhat ahead of the ordinary Kentucky municipalities.

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Probably our oldest member in the New York Fire Department, Deputy Chief Engineer William T. Beggin, commanding the Eighth Division, composing the borough of Richmond, recently delivered an address before the pupils of the Curtis High School in St. George on fire prevention. He outlined in his address all of the principal domestic hazards which the pupils can easily comprehend, and instructed them how to report a fire by familiarizing themselves with the location of fire alarm boxes and the telephone number of headquarters. Chief Beggin also laid special emphasis upon the importance of taking the school fire drill seriously, urging that each drill should be made with the same energy and promptness as though it were made to escape the flames. They would thus become so accustomed to prompt action that when necessity actually required their exit it could be made without excitement and comparatively little danger. The chief appeared in his full uniform and was naturally warmly received by the admiring pupils.

One of our Philadelphia members, Mr. R. M. Hook, delivered an address at the City Business Club's weekly luncheon at the Colonade, Philadelphia, in November, dwelling principally upon the economic significance of fire losses and the contrast between American fire waste and that of foreign countries.

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Our Kansas member Mr. Harrison Parkman, the recently elected state fire marshal, is exceedingly active in fire prevention work in his state. Among the good things he has initiated is a course in fire protection to be offered fire departments in the towns of Kansas, as announced by the extension division of the University of Kansas. The course is planned to encourage the small town departments to act as advisers on fire prevention in the community as well as fire fighters. Lectures designed to give instruction in the latest methods of fire protection have been prepared for the course by Fire Marshal Parkman.

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Mr. P. Hevener of the Rock Island lines, member of our Railroad Property Committee, prepared a most interesting article for the *Employees' Magazine* published by his company, showing the results accomplished by the division officers of the Rock Island lines in connection with their Fire Prevention Day celebration. Each superintendent was communicated with, under date of September 17th, as follows:—

October 9th has again been set aside by the governors of the various states, and the National Fire Protection Association, as Fire Prevention Day. The real purpose of this day is to make a fall clean-up of premises before the setting in of winter, and I trust you will circularize this matter among your agents, master mechanics and other subordinate officers, and see if we, on the Rock Island, cannot make it a day of general house cleaning.

In order that I may make a report to the General Fire Prevention Committee, I would be pleased to have you advise me as soon after October 9th as possible some few of the things that have actually been accomplished on your division in celebration of Fire Prevention Day.

A report in detail was duly received from all the divisions. The vigorous manner in which the suggestion was taken up by the division officers is worthy of the highest commendation. We enumerate a few of the more important accomplishments:—

Interior of all buildings given a thorough house cleaning.

Rubbish, grass and all other inflammable material removed from under and around buildings.

Fire apparatus, hydrants, hose, couplings, etc., carefully examined to insure efficient service in case of emergency.

Provision made for oil storage and lamp cleaning outside of main buildings, and fresh sand provided.

Stovepipes and flues inspected and defects remedied.

Birds' nests removed from eaves of buildings to prevent engine spark fires.

Accumulations of old straw, hay, etc., removed from stockyards.

Metal boxes provided for storage of matches and fuses.

"No Smoking" signs posted.

Bunk cars thoroughly cleaned out.

Open spaces under platforms and buildings boarded up.

Mr. Hevener concludes his article with the following paragraph:—

We are going to have another big celebration on that same date next year, but in the meantime why would it not be distinctly advantageous to us all to recognize every day as Fire Prevention Day,—and celebrate to the fullest extent of our ability? IT WOULD.

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The state of New Jersey in October observed Fire Prevention Day for the first time. This subject was taken up with President Wilson while governor by our New Jersey member Engineer Chas. H. Fischer, who urged Governor Wilson to issue such proclamation. Governor Wilson being absorbed in his campaign for the presidency did not give the necessary attention to the matter, and Mr. Fischer finally accomplished his purpose through the Jersey City Chamber of Commerce. This enterprising body now contemplates special action regarding future Fire Prevention Day observances. It intends to bring the matter before the different commercial bodies throughout the state. Captain C. Albert Gasser of Newark was also a prime mover in this work in New Jersey, establishing a most interesting fire prevention exhibit in the rooms of the Fire Board at the City Hall in Newark. *The Newark Evening News* commented upon this exhibit editorially as follows:—

The fire prevention exhibit, now in progress in the rooms of the Fire Board at the city hall, is one which the citizen would do wisely in visiting. With its bearing on taxes, insurance, safety and other important things, it is distinctly worth while. This is so, not only to the property owner, but to every person who lives in a house or who is employed in a factory, store or office. Fire prevention is of vastly more importance than fire fighting in its bearing on human life and property. Too few residents know of the excellent work which is being done by the Bureau of Combustibles and Fire Risks, which arranged this exhibit. Ignorance of the first principles of fire prevention is hardly excusable in the face of this public educationally practical demonstration.

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One of our Oregon members, Mr. Frederick H. Cowles of Medford, who is at present especially interested in the promotion of teaching fire prevention in public schools, has given considerable publicity in the West to the personal letter received by him from Thomas A. Edison warmly indorsing such teaching. Mr. Edison ventures the opinion in his letter that we are too apt to say "don't" without giving the young mind a reasonable reason therefor.

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Our active member the Factory Insurance Association, of which our former President H. L. Phillips is manager, has recently issued a handsome set of plans for a standard cotton mill. Anyone especially interested in the construction of these properties will find the plans of absorbing interest. As a further evidence of Mr. Phillips' public spirit he has issued under the seal of his Association a bulletin on "How to

Prevent Fires in the Home." These are to be circulated in the homes of all employees of the factories supervised by the Factory Insurance Association. It is a good example of welfare work.

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Our Wisconsin member Mr. Clem Host, State Fire Marshal, issued in December a special bulletin to chiefs of fire departments of Wisconsin cities giving full information respecting the new inspection law. This law requires that the chief of every fire department either personally or through the fire department force inspect all property within the fire limits once each quarter, and in the territory outside the fire limits twice each year, for the discovery of fire hazards. A complete record of such inspections is to be kept on file at department headquarters. The Fire Marshal recommended that City Boards fix a reasonable compensation for such inspection work done by volunteer firemen. The state of Wisconsin is a leader in many good things but no recent law is more calculated to conserve the welfare of its people than this directing regular inspections of cities, towns and villages by the fire department. Fire Marshal Host also issued a Holiday Bulletin incorporating the injunctions contained in the Christmas Bulletin of the N. F. P. A.

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An illustration of what one man can do in providing a Fire Prevention Day demonstration was the action of the Commercial Club of Kansas City in arranging a parade in that city. Our Kansas City member Mr. Lyle A. Stephenson, who is Vice Chairman of the Insurance Committee of the Commercial Club, induced that organization not only to print fire prevention suggestions and sow them broadcast throughout the city but to take the initiative in the arrangement of an "anti-fire" parade, following the outline of such a parade suggested in the Fire Prevention Day Program issued by the N. F. P. A. The Mayor and city officials and the Commercial Club directors and members in motor cars participated in the parade, which with the bands, the boy scouts, four companies of the Third Regiment and several hundred firemen made a distinct impression upon the citizens of Kansas City.

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Our member Mr. Albert E. Crane, whose work in connection with fire prevention education in Bloomfield, N. J., has been previously mentioned, has secured the unanimous support of the Bloomfield Board of Trade for a work outlined by the committee of that body of which he is chairman. The work to be undertaken is an inspection of the school buildings of the town with a view to discovering defects either in hazard or construction, a general campaign of education in the local press, and a study of all model ordinances of the N. F. P. A. with the purpose of securing their adoption by the municipal authorities. An interesting

incident in connection with this work of our Bloomfield member is that following the announcement that the schools were to be inspected, the school board itself made a move in anticipation which developed the fact that the standpipe hose in the various buildings, six large buildings coming under this head, had not been tested for five years and also that the lines are on small service mains which developed a very weak hose stream.

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Our North Carolina member Mr. James R. Young, Insurance Commissioner, has undertaken the promulgation of a weekly news bulletin for the information of the state's newspapers and their readers. This bulletin contains much valuable fire prevention information and indicates the closer co-operation with our work manifested by the members of our active member the National Convention of Insurance Commissioners.

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The *Insurance Field* has brought out an able and interesting revision of the Crosby-Fiske handbook of Fire Protection which has long been a familiar volume on the desks of our members. The original volume, compiled by our old members, Everett U. Crosby, for many years Secretary of the N. F. P. A., and Henry A. Fiske, the first editor of the QUARTERLY, was the first of its kind. The recent republication (representing the fifth edition) revised, enlarged and brought up-to-date, brings to one's desk a competent authority on all matters of fire protection and prevention, construction, equipment and installation for about every character of improved risk. A new section written by H. W. Forster, Chairman of our Committee on Safety to Life, deals with the subject of burning buildings and life hazard. Mr. E. V. French, Chairman of our Committee on Private Fire Supplies from Public Mains, contributes the section devoted to these topics. Our former President, W. H. Merrill, contributes a description of the Underwriters' Laboratories, that important and growing adjunct to fire protection service. It is a volume which most of our members will desire to have.

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One of our Kansas City members, the International Clay Products Bureau, has issued an attractive little pamphlet containing the suggested ordinance of the N. F. P. A. for the construction of chimneys and flues, illustrating the same with characteristic burn-outs and fires set by defective chimneys so impressive as to make the little leaflet a very valuable tract to those sections of the country which are plagued by slipshod chimney construction and consequent continuous fires from that source. We assume our member, whose address is the New York Life Building, Kansas City, will be glad to furnish copies to those especially interested.

A lecture on the Economic Significance of the Fire Waste was delivered by our New York member, Mr. Edward R. Hardy, before members of the American Society of Mechanical Engineers at the Brooklyn Polytechnic Institute one evening in November.

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Mr. H. B. McMaster, our member at Youngstown, Ohio, delivered a stereopticon lecture upon the Relations of Fireproofing Materials to Fire Prevention at a recent meeting of the Up-to-Date Club of that enterprising city.

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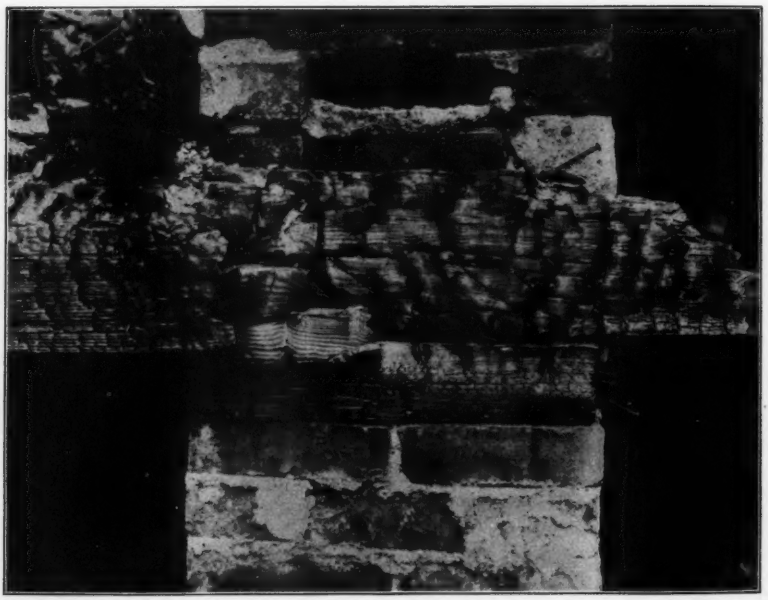
Mrs. P. P. Tucker of Dallas, Texas, through whose interest in our cause a printed address was recently promulgated to all the women's clubs of America, delivered an address at the last meeting of the State Federation of Women's Clubs at Corpus Christi, Texas, in furtherance of her good work already begun. Mrs. Tucker's address was so practical and contained so many helpful suggestions it was subsequently sent to the press of the state by the fire marshal's office at Austin.



Photograph from Kansas City member.

Chimney Construction in Missouri.

A chimney with 4-inch exterior walls (one course of brick) without flue lining of fire clay. A single brick was jarred out by the vibrations of the floor *which was attacked to the chimney.* The house was destroyed by fire from this defect.

Our New Chapter Organizations.

The Committee on Public Information at its first meeting held in Philadelphia, October 16th, decided that the work immediately before it was the organization of local sub-committees in such cities, states or provinces as have no fire prevention association. The cities suggested for immediate organization were Boston, New York, Philadelphia, Pittsburgh and Chicago, the large cities in which members of the national committee reside. The chairman of the national committee was authorized to organize at his discretion sub-committees in other localities.

The plan contemplates that every associate member of the N. F. P. A. in the division organized, city, state, or province, shall be a member of the local sub-committee, and that this local sub-committee, electing its own officers and making its own by-laws in harmony with the purposes of the national organization, shall become automatically a regular chapter of the national organization, with representation in its councils on the basis of an active member as soon as the national body at its annual meeting in May shall so change its Articles of Association as to recognize the chapter form of organization. In reality the local sub-committees as soon as organized become at once to all intents and purposes local chapters, and call themselves such, the distinction being merely technical, pending the formal action of the association in May.

The financial plan which the association will be asked to indorse (and which is already in operation by authority of the national committee in the sub-committees so far organized) is that the national association shall accept as the dues of associate members who are affiliated with local chapters $4 per year instead of the $5 now received, and that the one dollar per member thus released shall be devoted to financing the local chapter, the total dues remaining as at present $5 per year. Thus every member of the local chapter will be an associate member of the national body, with all the privileges of such associate membership and receive regularly as issued, as now, copies of all the publications of the national body. This is considered essential, that every member's interest may be kept alive and the larger outlines of the work not be obscured. The one dollar per year from each member in the local chapter will easily cover local expenses for printing, postage, etc., and as the membership grows, furnish if desired a liberal annual fee for the secretary or other executive officer who devotes special time and energy to the work of the local organization.

The extent of the chapter work itself and the local good that may result from it is limited only by the imagination of the leaders in it. Such

local chapter can take cognizance of, and take part in, practically every movement for civic good. Through its efforts and influence building codes can be revised; the N. F. P. A.'s model ordinances and fire prevention standards applied and enforced, honest officials upheld in their work, park ways and other open spaces promoted, inspections by fire departments inaugurated and kept up to efficiency, fire-bugs prosecuted, and other similar special service rendered to the community, beside the conduct of a continuous campaign of education in fire prevention in the press, the schools, the clubs, and wherever else opportunity offers.

Where local commercial bodies already have fire prevention committees, these should be drawn into the chapter and their work made effective by the co-ordination of all such effort. A committee of a commercial organization is necessarily but a small section of a body whose principal interests lie in other directions; where there are several such committees their work is frequently isolated. By affiliation with our local chapters a united front can be presented and all such committees be made vastly more effective by deriving inspiration from a central body devoted to the single purpose of protecting life and property from fire. Our local chapters can multiply and extend indefinitely the force and influence of the national association. Such organization is a logical and necessary extension of our work, imperative if we are to cope with the increasing fire hazards of our complex civilization.

At the time of the QUARTERLY's going to press, three local chapters are already organized and getting their work under way: one provincial, Manitoba, and two city chapters, Chicago and Boston. The associate members in three other cities have held preliminary meetings to promote future organization, viz.: Montreal, New York and Pittsburgh.

Manitoba Chapter.

It is a feather in the cap of our members in the great Dominion that the Province of Manitoba was the first to perfect the organization of a chapter of the National Fire Protection Association. Taking advantage of the presence of Secretary Wentworth in Winnipeg a meeting of all associate members in the Province, some thirty in number, was called for December 12th for the purpose of organizing. The meeting was well attended and eleven new members affiliated with the local chapter after organization. Mr. Geo. H. Jackson of Walter Woods and Company, Winnipeg, Chairman of the Fire Prevention Committee of the Winnipeg Board of Trade, presided, and was subsequently elected President of the chapter. Mr. H. R. Page of the Dominion Trust Company of Winnipeg was elected Secretary and Treasurer. Hon. A. Lindback, Fire Marshal of the Province, addressed the meeting, after which a general discussion as to the prospective work of the chapter took place, and it was voted that a meeting be called immediately after the holidays. Much interest and enthusiasm was manifested at the December meeting and the prospects for a large and influential chapter in Manitoba are bright.

Chicago Chapter.

Chicago carried off the honors for the first permanent organization in the States, which was perfected at a meeting of Chicago associate members on Monday, December 15th, at Hotel La Salle. Under the efficient temporary chairmanship of Manager Wm. H. Merrill of the Underwriters' Laboratories no time was lost in

getting at the essentials of the organization. With the assistance of Mr. Chas. L. Hecox, Mr. Ernest Palmer, and Mr. J. Glidden, who contributed speeches of enthusiasm, a nominating committee was appointed and retired for deliberation immediately after the formal resolution organizing the chapter. Mr. Frank D. Chase, architect and engineer, and for some years chairman of the Fire Prevention Committee of the Chicago City Club, was unanimously elected president, and Mr. Wm. S. Boyd, Secretary of the Western Association of Electrical Inspectors, unanimously elected secretary and treasurer. President Chase was at once invited by temporary chairman Merrill to take the chair, which he did amid enthusiastic applause, and contributed an impromptu speech full of energy and aspiration which convinced the members that their choice of a president was most happy. The first regular meeting of the new chapter was called for Monday evening, January 12th, in the Insurance Exchange Building, which was attended by President Robert D. Kohn and Chairman F. J. T. Stewart of the Executive Committee of the N. F. P. A. The members of the Industrial Board of the New York State Department of Labor, who were visiting Chicago during the week, were also invited as the guests of the chapter. We regret that the QUARTERLY goes to press too soon to permit publication of the story of this interesting meeting. There are at present nearly two hundred members in the Chicago chapter, and President Chase declares that every effort will be made to secure a membership of one thousand before the annual meeting in May. As Chicago never does things by halves such a record may not be unexpected.

Boston Chapter.

The Boston Chapter of the N. F. P. A., which includes the metropolitan district of the Hub, was organized Monday, December 29th upon the day on which the Massachusetts State Fire Prevention Association ceased its independent existence. When the proposition to organize a metropolitan chapter was advanced, the executives of the Massachusetts State Fire Prevention Association laid before the members of that body a proposition to merge its organization into that of the Boston Chapter of the N. F. P. A. The proposition was unanimously accepted, and the members of the State Fire Prevention Association, together with the Boston associate members of the N. F. P. A., met in a joint meeting on the date aboved named. Former President of the N. F. P. A., Mr. C. M. Goddard, presided as chairman of the meeting, which resulted in a permanent organization of Boston Chapter, with Mr. Chas. H. Cole, Fire Commissioner of the City of Boston, as president, and Mr. Robert O. Dawson, Superintendent Fire Records of the N. F. P. A., as secretary and treasurer. Mr. G. A. A. Pevey, a Boston attorney, who has been interested in fire prevention work, was elected vice president. These three officers, *ex officio*, are to constitute the executive committee, with Mr. C. M. Goddard, Secretary of the New England Insurance Exchange; Mr. Richard L. Gay of the Massachusetts Boards of Trade; Mr. W. O. Teague of the New England Factory Mutual Insurance Companies, and Prof. C. W. Killam, Architect, of Harvard University, as the other members. Enthusiastic speeches were contributed by Mr. Chas. F. Danforth, former secretary of the Massachusetts State Fire Prevention Association, Mr. C. H. Blackall of the Boston Chamber of Commerce and others. A meeting of the executive committee of the chapter was held on January 7th, and a plan of campaign outlined, including the active support of a bill for a Metropolitan Fire Prevention Commission which the Boston Chamber of Commerce has recommended to the Massachusetts legislature. The chapter is also planning to arrange a fire prevention mass meeting in Fanueil Hall to be addressed by speakers of national reputation. Special committees were appointed and important work assigned them.

Pittsburgh Chapter (Prospective).

Pittsburgh associate members of the N. F. P. A., and other interested citizens, held a preliminary meeting in the Select Council Chambers in City Hall, Pittsburgh, on November 20th. Mr. H. M. Wilson, Engineer, U. S. Bureau of Mines,

acted as chairman. Mr. W. H. Coster, Inspector, Department of Public Safety, Municipal Explosives Board, was appointed acting secretary. Mr. Wilson gave a brief history of the N. F. P. A., giving its aims and the reasons for calling the meeting, after which a committee of three was appointed to nominate officers for a permanent organization. The committee appointed by the chairman consisted of Dr. Irving C. Allen, Chemist of the Bureau of Mines, U. S., Mr. W. S. McDowell, former secretary Local Building Code Commission, and Mr. W. H. Coster. The meeting then adjourned to reassemble at the call of the chairman for the purpose of electing officers and effecting a permanent organization.

Montreal Chapter (Prospective).

A round table dinner conference was given by the Montreal Joint Fire Prevention Committee on the evening of November 28th for the purpose of receiving suggestions from the Secretary of the N. F. P. A. respecting the prospective formation of a Montreal or Quebec chapter. Speakers at the meeting were Mr. W. E. Findlay, Fire Chief J. Tremblay, and others. The Joint Fire Prevention Committee was organized subsequent to Secretary Wentworth's visit to Montreal early in the season, and is composed of three representatives, each from the Montreal Board of Trade, Chamber of Commerce, the Canadian Manufacturers Association, the Builders' Exchange, Montreal Electrical Association, Montreal Architectural Association, and the Canadian Fire Underwriters' Association. A formal organization of the proposed chapter of the N. F. P. A. was deferred pending the completion and adjustment of certain questions now under consideration by the joint committee and the city officials. It is believed by the Montreal members that a vigorous and influential chapter will be organized as soon as the above matters can be satisfactorily adjusted.

New York Chapter (Prospective).

The meeting called for Friday evening, December 12th, in the Engineering Society's Building for the organization of a local chapter of the N. F. P. A. in New York City was started auspiciously with over fifty engineers, fire protection appliance people and underwriters present. Rudolph P. Miller, superintendent of the building department, Borough of Manhattan, acted as chairman, and Edward R. Hardy, assistant manager of the New York Fire Insurance Exchange, was secretary. The chairman explained the reason for the meeting being called and suggestions were asked from various ones present. It was finally decided to appoint a committee of ten, who will report on a constitution and by-laws as well as the scope of the organization at a meeting to be held during the last of January. The meeting was successful in bringing out a wide interchange of views as to the desirability of an organization for New York City. A number of prominent fire protectionists who were not able to be present sent letters signifying their support.

Meeting of Executive Committee.

A meeting of the Executive Committee was held in Philadelphia, Pa., on October 17, 1913, the following members being present:—

F. J. T. STEWART, New York, *Chairman.*
POWELL EVANS, Philadelphia.
C. M. GODDARD, Boston.
E. B. HATCH, Chicago.
E. P. HEATON, Toronto.
C. A. HEXAMER, Philadelphia.
W. E. MALLALIEU, New York.
JAMES MCFALL, Roanoke.
ELLIOTT MIDDLETON, Memphis.
R. P. MILLER, New York.
C. H. PHINNEY, Boston.
L. WIEDERHOLD, JR., Philadelphia.
ROBERT D. KOHN, New York, *President.*
FRANK M. DRAKE, Louisville, *Vice President.*
FRANKLIN H. WENTWORTH, *Secretary-Treasurer.*

The following standards as amended subsequent to annual meeting by the Committees in charge of same, were adopted:—

1. Rules and Requirements for automatic and open Sprinkler Equipments.
2. Rules and Requirements for the Construction and Installation of Gas Shut-off Valves.
3. Rules and Requirements for the Construction and Installation of Oil Burning Equipments.
4. Rules and Requirements for the Construction and Installation of Dip Tanks.

Mr. J. G. Parsons, representing Joseph H. Allen for Committee of Manufacturers formed to assist in securing cheaper alcohol for industrial purposes, appeared before the Committee in reference to suggested ordinance on Inflammable Liquids. The Secretary of the Association was requested to notify Mr. Allen that should the U. S. Department of Agriculture undertake an investigation into the fire hazards of alcohol, and as the result of such investigation the Executives find that the suggested ordinance as adopted imposes a hardship that is not warranted, then, in accordance with the Association's established custom, the ordinance will be at once reconsidered.

The Code of Ordinances suggested for small towns and villages was adopted as revised by the Committee on Laws and Ordinances with the proviso that an explanatory preface to the same be included in the publication, member Goddard voting in the negative on the building ordinance.

The following bodies were elected active members:—

1. American Institute of Mining Engineers.
2. Gypsum Industries Association.

Mr. Dana Pierce of New York, associate member, was appointed official delegate to the next meeting of the electrical interests represented by J. Robert Crouse.

Mr. A. H. Nuckolls was appointed representative of the Association on the sub-Committee on Paint Thinners other than Turpentine of the Committee on Protective Coatings of the American Society for Testing Materials.

The following resolution passed by the National Fire Prevention Convention, in session in Philadelphia, was laid before the Executives by member Evans:—

RESOLUTION: It is the sense of this convention that in view of the growth of state laws and municipal ordinances to prevent the appalling loss of life due to fire and to control fire waste by the widespread legal imposition of physical requirements upon the construction, protection and equipment of buildings, it is important that

(*a*) Physical standards upon this entire subject be formulated which may be generally and legally imposed without undue hardship or cost upon the public; and

(*b*) That the Federal Government, through its Bureau of Standards of the Department of Commerce, should arrange to review such standards for approval and promulgation in uniform language to the end that they may be used by states and municipalities in laws and ordinances:

And therefore be it further RESOLVED

(*c*) That the National Fire Protection Association be requested through its Executive Committee to arrange for a conference of delegates with the chairman of this convention as chairman, from the American Society for Testing Materials, the American Society of Mechanical Engineers, the American Society of Civil Engineers, the American Institute of Electrical Engineers and all kindred national societies having standards bearing on this subject for the purpose of collecting such standards for submission to the Federal Government.

And be it further RESOLVED

(*d*) That the conference thus formed be requested to take the necessary steps to bring these resolutions before Congress and to secure the required legislation at the earliest opportunity.

After discussion of this resolution it was voted that Chairman Stewart of the Executive Committee, President Kohn of the National Fire Protection Association, and Powell Evans of our Executive Committee, who was chairman of the National Fire Prevention Convention, be appointed a sub-committee to consider and take action in regard to the request contained in section (*c*) of the resolution.

The President, the Secretary and the Chairman of the Executive Committee were appointed a Committee on Program for the annual meeting May 5, 6 and 7, 1914.

The Committee on Electric Railway, Light and Power Properties was requested to submit a poll of its members as to the need for revision of the Rules and Requirements for the Construction and Protection of Standard Railway Car Storage and Operating Houses.

Committee on Safety to Life.

Report of First Meeting.

The first meeting of the new Committee on Safety to Life was held November 6th in the rooms of the New York Board of Fire Underwriters, 123 William Street, New York City. The chairman, H. W. Forster of the Independence Inspection Bureau, together with the following members were present: Messrs. Canada, Dawson, Hansen, Newbern, Palm, Newell and Tolsted.

Mr. C. L. Close, Secretary Bureau of Safety, Relief, Sanitation and Welfare of the United States Steel Corporation, was present as the unofficial representative of the National Council for Industrial Safety, which organization had been invited to appoint a member to this committee but had not been able to act on the invitation. The first part of the meeting was devoted to an informal discussion of the many possible phases of activity for the Committee to undertake, and included reference to such subjects as the need of reliable statistics on loss of life by fire, life hazard of theatre, dressing rooms, moving picture theatres, Y. M. C. A's., churches and similar buildings in which a large number of people congregate or where the moving picture is being used. The subject of egress in buildings with respect to the present laws and their effect on any attempt at standardization of such rules was considered. Many interesting features from the point of view of the liability insurance companies were brought out by Mr. Hansen, who also informed the committee that the Workmen's Compensation Service Bureau were printing a new standard to guide the liability companies in their schedule rating procedure. The value of this publication as a reference work for the committee was favorably commented upon. Another interesting part of this informal discussion were the remarks by Mr. Close regarding the work of the National Conference for Industrial Safety which, he stated, was going to prepare a primer for school children along the lines of accident prevention; to encourage various municipalities to organize Citizen Committees to study their local safety conditions; and further that it was their intention ultimately to become a clearing house for all information respecting industrial safety in all its branches.

The first formal action taken by the committee was to define its scope of work, as requested by the Executive Committee. It was finally decided that the work should be restricted to those phases of the safety

to life problem which were identified with fire prevention and fire protection. It was further voted that the committee should limit its activities at present to the completion of the three following items:—

(1) A review of existing N. F. P. A. standards from the point of view of safety to life, so as to point out to the respective committees suggestions for the improvement of these standards in this respect.

(2) A study of the subject of egress and the formulation of some standards or rules covering the engineering features, and possibly later the principle of apportioning means of egress to the number of occupants, with due regard to the character of building, height, hazards, etc.

(3) Presentation of the advantages of automatic sprinkler protection from the standpoint of safety to life.

The best method for carrying on this work was deemed to be by dividing into three sub-committees, each to report back the results of their work to the committee as a whole for ratification.

All members of this Association should make it a special duty to give the results of any experience or ideas they may have to the chairmen of the respective sub-committees, the membership of which is given below:—

Standards.

Chairman.—MR. E. B. TOLSTED, Department Engineer, Independence Inspection Bureau, Philadelphia, Pa.

MR. F. E. CABOT, Secretary, Boston Board of Fire Underwriters, 55 Kilby Street, Boston, Mass.

MR. R. W. CAMPBELL, President of the National Council for Industrial Safety, 72 West Adams Street, Chicago, Ill.

MR. W. J. CANADA, Associate Physicist, Bureau of Standards, Department of Commerce, Washington, D. C.

MR. CARL M. HANSEN, 80 Maiden Lane, New York City.

MR. ROBERT PALM, Fire Protection Engineer, American Sugar Refining Company, South 4th and Kent Avenue, Brooklyn, N. Y.

Egress.

Chairman.—MR. WILLIAM NEWELL, Mechanical Engineer, Bureau of Factory Inspection, State of New York, 381 4th Avenue, New York City.

DAVID S. BEYER, Manager, Accident Prevention Department, Massachusetts Employees Insurance Association, Boston, Mass.

COL. LEWIS T. BRYANT, Commissioner of Labor, State of New Jersey, Trenton, N. J.

MR. R. H. NEWBERN, Superintendent of Insurance, Pennsylvania Railroad Company, Broad Street Station, Philadelphia, Pa.

MR. JAMES WHITE, Assistant to Chairman, Commission of Conservation, Ottawa, Canada.

Automatic Sprinklers.

Chairman.—MR. R. O. DAWSON, Superintendent Fire Records, National Fire Protection Association, 87 Milk Street, Boston, Mass.

MR. HENRY B. CROSS, Secretary, General Fire Extinguisher Company, Providence, R. I.

MR. L. H. KUNHARDT, Vice President and Engineer, Boston Manufacturers Mutual Fire Insurance Company, 31 Milk Street, Boston, Mass.

Philadelphia Fire Prevention Convention.

The National Fire Prevention Convention held in Philadelphia during the week of October 13th to 18th was attended by many members of the National Fire Protection Association. The dates coinciding with the issue of the October QUARTERLY it could not be reported in that number. This convention was initiated and conducted by Mr. Powell Evans of Philadelphia and the useful purpose it served in promoting the cause of fire prevention should be credited almost wholly to him. Mr. Evans has for many years been a zealous worker in this cause and it was at his suggestion that the National Association of Credit Men and the National Association of Manufacturers first applied for active membership in the N. F. P. A.

Mr. Evans did a prodigious amount of work in planning and working out the Philadelphia convention. He personally planned the scope and title of each paper presented, that each might fit into the scheme without duplication, and where persons who were asked to prepare papers did not respond he wrote and presented them himself. By further assuming the arduous task of acting as presiding officer of the convention at every session during the entire week, he was able to carry out his comprehensive plan and adjourn the convention on schedule time. It was a masterful performance and demonstrated how effectively a devoted, able and enthusiastic propagandist may work when unhampered by the advice or restraint of others.

We cannot, with our limited space, attempt more than a brief outline of the form and accomplishments of the convention. The published proceedings of the same (another Herculean task Mr. Evans is assuming) will set out the entire transactions in detail and will be available shortly. In advance of such publication Mr. Evans has kindly furnished us the main features of the activity of the convention with the resolutions as finally adopted, constituting a complete syllabus and the only correct report to date. The number of acceptances was 381 and the number actually registered 254. As there are always many at conventions who do not register it is fair to assume that approximately 300 delegates from the National, State and Municipal Governments, Trade, Civic and Underwriting organizations from all sections of the country were in attendance during the week.

The Committee on Resolutions was as follows:—

Chairman, Mr. Powell Evans, Chairman Fire Prevention Commission of Philadelphia, Chairman Fire Prevention Committee, Chamber of Commerce of U. S. of A.

Dr. S. W. Stratton, Director, Bureau of Standards, Department of Commerce, Washington, D.C.

Mr. H. M. Wilson, Engineer, Experiment Station, Bureau of Mines, Department of Interior, Pittsburgh, Pa.

Mr. A. Lindback, Fire Commissioner of Manitoba, President Fire Marshals' Association of North America.

Col. Lewis T. Bryant, Commissioner of Labor, State of New Jersey, Trenton., N. J.

Mr. Charles H. Cole, Fire Commissioner, City of Boston.

Mr. William Guerin, Chief of Fire Prevention Bureau, City of New York.

Mr. Lawrence Veiller, of the Charity Organization Society, New York City.

Mr. Henry Bruere, Director, Bureau of Municipal Research, New York City.

Mr. Charles E. Meek, First Vice President, National Association of Credit Men, New York City.

Mr. Robert D. Kohn, of American Institute of Architects, President National Fire Protection Association.

Mr. John R. Freeman, of Factory Mutual Fire Insurance Companies, Providence, R. I.

Mr. W. E. Mallalieu, General Manager, National Board of Fire Underwriters, New York City.

Mr. C. M. Goddard, Secretary New England Insurance Exchange, Boston.

Mr. Oscar B. Ryon, General Counsel, National Board of Fire Underwriters, Chicago.

Mr. R. H. Newbern, Superintendent of Insurance, Pennsylvania Railroad Company, Philadelphia.

Hon. C. A. Lantz, President Pennsylvania Association of Mutual Fire Insurance Companies, Lebanon, Pa.

The tentative Resolutions, designed to introduce each topic of the Convention, proved a highly satisfactory method of concentrating papers and discussions on distinct phases of the work.

At the conclusion of the consideration of each topic these Resolutions were debated, with the happy result that in all but three cases they were unanimously adopted as presented, and in these remaining three cases were unanimously adopted in the substance of those presented—showing practically unanimous judgment of the Convention with respect to the course of action which should be pursued in each phase of the work to abate and control fire waste in America.

The exact text of these Resolutions as adopted is given below under each topic:—

The Convention was organized in the Mayor's office, City Hall, by Director of Public Safety Porter under the following—

General Preamble and Resolution unanimously adopted, viz.:

Whereas: American fire waste of life and property has for many years been a heavy burden on the whole people, and

Whereas: The cost of fire insurance and protection cannot materially decrease except as the fire waste falls, and

WHEREAS: A large proportion of this fire waste is admittedly preventable and controllable by concerted state and municipal regulation, and

WHEREAS: American states and municipalities now occupy no common ground and follow no common policy and have no clearing house for concerted uniform action to prevent and control fire waste (which is a common peril and expense),

THEREFORE, this National Fire Prevention Convention has been called for the following purposes:

1. To consider the physical, moral, legal, legislative and administrative means to control and reduce fire danger to life and property in America (discussion of the Fire Insurance Underwriting problem being limited to its effective relations to the above-defined program).

2. To initiate a completely developed movement to educate the public about fire danger and waste; and to study, prepare, get enacted and continuously enforced everywhere throughout the country appropriate minimum legal requirements to protect life and property from fire—by organizing municipal branches and from them state associations, and from them a national agency (preferably through the National Fire Protection Association—enlarged in purpose and membership, acting through its new Committee on Public Information).

The above was followed by the reading of an address of welcome from Mayor Blankenburg, followed in turn by an address of permanent chairman Powell Evans, giving the reasons for calling the convention.

This session then adjourned, to witness an exhibition of the Philadelphia fire fighting forces. The afternoon session was convened at the Bellevue-Stratford Hotel, and immediately took up—

Topic 1.—"Location" (Exposure Hazard).

The first paper, "Legal Phase," was read by Mr. W. S. McDowell, lawyer and secretary "Committee for Revision of Building Laws," Pittsburgh; and following this the second paper on "Physical Phases," by Walter F. Ballinger, engineer and architect, Philadelphia. These were followed by a general discussion, resulting in the unanimous adoption of the following resolution on the topic, viz.:—

It is the sense of this convention that fire is always local, originating from a definite cause in a definite property on a definite location; hence, every building in reasonable relation to its size, character, use and the congestion of its location should be so constructed as to prevent the passage of fire from within to without and *vice versa*.

Topic 2.—"Zones of Danger."

The first paper on this topic was presented by Messrs. Charles H. Cole, Fire Commissioner of Boston, and Francis R. Bangs of Boston Metropolitan Fire Hazard Commission; and a second paper by Edwin Clark, Chief Bureau of Building Inspection, Department of Public Safety, Philadelphia.

These were followed by discussion which resulted in the unanimous adoption of the following resolution:—

It is the sense of this convention that populous communities should be divided into danger zones, whereby rules reasonably limiting, defining and regulating the presence, form and use of property may be legally imposed, with due regard for the present and near prospective congestion of life and property in such areas.

The morning session of Tuesday, October 14th, took up the consideration of—

Topic 3.—"Building Construction."

The first paper on this topic, "Life Hazard," was presented by Messrs. H. F. J. Porter, Engineer and Secretary Efficiency Society, and A. L. A. Himmelwright, associated engineer, both of New York City; and a second paper by Mr. John Price Jackon, Commissioner of Labor and Industry of Pennsylvania, Harrisburg.

These were followed by a paper on "Property Hazard" by Mr. Rudolph P. Miller, Superintendent of Buildings of Manhattan (N. Y.).

Discussion was concluded by the unanimous adoption of the following Resolution:—

It is the sense of this convention that all building construction and reconstruction—having in view the present and near prospective congestion of its location and the range of occupancy proposed—should fully include in design, specification, construction and appliances adequate safeguards against danger to life and property. All buildings should be required by law to be fitted with adequate fire exits and escapes proportioned to their human occupancy in accord with reasonable exit tests. Outside fire escapes are deemed the least desirable of all forms.

Topic 4.—"Building Codes."

The first paper on this topic was presented by Messrs. D. Knickerbacker Boyd, Chairman Publicity Committee of the American Institute of Architects, and W. L. Plack, architect, both of Philadelphia.

Then followed three further papers by, respectively, Messrs. Robert D. Kohn, architect, President National Fire Protection Association, New York City; Frank M. Drake, lawyer, Vice President of the N. F. P. A., Louisville, Ky., and Virgil G. Marani, chairman building code committee, Cleveland Engineering Society, and of the joint committee representing Cleveland organizations on the proposed Ohio state building code.

The discussion which followed concluded with the unanimous adoption of the following Resolution proposed by a sub-committee named for this purpose, viz.:—

It is the sense of this convention that—

(*a*) All building construction and reconstruction should be under government control—state or local—to the end that the greatest safety for the greatest number for the present and future should be assured; and

(*b*) Each of the several states should adopt a state building code with requirements which local governing bodies may raise but not lower by local enactment, said requirements to be enforced by proper governmental machinery over all of each and every state; and

(*c*) The classification of building construction is entirely one of relative ability to resist attacks by fire, and therefore in all building codes the term "fireproof" should be replaced by "fire resistive," and ordinary frame construction should be classed as "combustible"; and

(*d*) The National Fire Protection Association is hereby requested to recommend approved standards of fire-resistive construction, which may be used by states and municipalities in their respective building codes.

(NOTE. Section (*d*) above was subsequently modified in its force and intent by Resolution adopted under Topic 8, "Compulsory Physical Standards," whereby the National Fire Protection Association and other originators of standards are asked to refer their recommendations for approval to the Bureau of Standards of the Department of Commerce of the National Government at Washington.)

The Tuesday afternoon session took up consideration of—

Topic 5.—"Protection (Private)."

The engineering phases of this topic were discussed in two papers presented respectively by Mr. H. O. Lacount, engineer inspection department, and Assistant Secretary Associated Factory Mutual Fire Insurance Companies, Boston, and Mr. F. J. T. Stewart, Superintendent of Surveys New York Board of Fire Underwriters, New York City.

"Life Hazard" was then considered in a paper presented by Mr. R. H. Newbern, Superintendent of Insurance, Pennsylvania Railroad Co., Philadelphia.

Discussion then followed which resulted in the unanimous adoption of the following Resolution, viz.:—

It is the sense of this convention that—

(*a*) Every building—for its own safety and that of its contents in life and property—should be fitted reasonably, with respect to its location, character and use, with proper mechanical aids to discover alarm and extinguish fire, and to resist lightning; and

(*b*) The occupants of every building should be reasonably educated regarding the physical structure thereof, and how to leave same in a quick and orderly manner, and be organized reasonably to fight fire therein.

Topic 6.—"Protection (Public)."

The physical phases of this topic were presented in three papers respectively, by Messrs. James Reed, Jr., Assistant Director Department of Public Works, Philadelphia (with special consideration of high pressure system for public protection), F. A. Raymond, Engineer National Board of Fire Underwriters, New York City (on general public protection of cities), and Clayton W. Pike, Chief of Electrical Bureau, Department of Public Safety, Philadelphia (with special regard to public signaling systems).

The "Management" phase of "Public Protection" was then presented in a joint paper by Messrs. Powell Evans and J. S. Mallory, Fire Marshal, Department of Public Safety, Philadelphia.

The discussion which followed was concluded by the unanimous adoption of the following Resolution, viz.:—

It is the sense of this convention that—

(*a*) All communities need physically a sure water supply, adequate in source and distribution, for public fire protection—broadly usable by citizens for private fire protection, under the least onerous terms—also adequate modern fire-fighting apparatus with proper personnel to operate same; also an adequate alarm system—all proportionate to the character, area and population of each community; and

(*b*) All fire-fighting forces should be efficiently organized in enduring form, under legal control and discipline when possible; their morals and requirements should be high and influenced solely by good-of-the service considerations; and the training should be constant and adequate for efficient fire-fighting and fire prevention inspection and the purchase and maintenance of valuable special mechanical apparatus.

The session Wednesday morning, October 15th, took up consideration of—

Topic 7.—"Equipment."

A paper was presented by Mr. G. S. Lawler, Electrical Engineer Inspection Department, Associated Factory Mutual Fire Insurance Companies, Boston.

Discussion followed which was concluded by the unanimous adoption of the following Resolution, viz.:—

It is the sense of this convention that—

All equipment for buildings should be adequately designed and constructed with respect to its fire hazard—productive or receptive—and that its use should be predicated on reasonable compliance with such requirements, and should be reasonably regulated everywhere by law.

Topic 8.—"Compulsory Physical Standards."

The first two papers were presented by Messrs. Powell Evans, Chairman Fire Prevention Commission, Philadelphia, and H. M. Wilson, Engineer Experiment Station Bureau of Mines, Department of Interior of United States, Pittsburgh.

A further paper was then presented on the same subject by Dr. E. B. Rosa, Bureau of Standards Department of Commerce of United States, Washington.

Discussion then followed which resulted in the unanimous adoption of a Resolution unanimously reported in by a committee appointed on this subject as follows:—

It is the sense of this convention that—

In view of the growth of state laws and municipal ordinances to prevent the appalling loss of life due to fire, and to control fire waste by the widespread legal imposition of physical requirements upon the construction, protection and equipment of buildings, it is now important that

(*a*) Physical standards on this entire subject be formulated which may be generally and legally imposed without undue hardship or cost upon the public, and

(*b*) That the federal government, through its Bureau of Standards of the Department of Commerce, should arrange to review such standards for approval and promulgation in uniform language, to the end that they may be used by states and municipalities in laws and ordinances, and therefore be it further resolved

(*c*) That the National Fire Protection Association be requested through its executive committee to arrange for a conference of delegates, with the chairman of this convention as chairman, from the American Society for Testing Materials, the American Society of Mechanical Engineers, the American Society of Civil Engineers, the American Institute of Electrical Engineers, and all kindred national societies having standards bearing on this subject, for the purpose of collecting such standards for submission to the federal government. And be it further resolved

(*d*) That the conference thus formed be requested to take the necessary steps to bring these resolutions before Congress and to secure the required legislation at the earliest opportunity.

Wednesday afternoon the delegates attended a luncheon and police drill at Fairmount Park.

Thursday morning's session took up consideration of—

Topics 9 and 10.—"Occupancy and Annual Occupancy Licenses."

The first paper on this subject was presented by Mr. C. Albert Gasser, Inspector Bureau of Combustibles and Fire Risks, Fire Department, Newark, N. J.

Then followed two further papers respectively by Edwin Clark, Chief Bureau of Building Inspection, city of Philadelphia, and C. A. Hexamer, Secretary Philadelphia Fire Underwriters' Association, Philadelphia.

Discussion then followed which resulted in the unanimous adoption of the following Resolution:—

It is the sense of the convention that—

(*a*) The individual occupancy hazard (the relative fire hazard to life and property in any given building, inherent in any given pursuit) should be definitely controlled as to construction by the building code; and as to management by proper police (or equivalent) continuous regulation to assure reasonable safety of life and property therein.

(*b*) The general occupancy hazard (the relative community hazard inherent in any given pursuit) should be definitely controlled in every populous community by law, which should exclude extra hazardous pursuits and properly place and safeguard by appropriate legal rules permissible hazardous pursuits in their appropriate danger zone (or other like delimited area); and

(*c*) The control of occupancy conditions, through requirements imposed by law, is essential for the abatement of fire waste, of life and property; and this control to be actual and effective should cover all property (at least in cities) and continuously—at least once annually and upon every substantial change of tenancy through the agency of an occupancy license based upon competent legal inspection by the fire-fighting force or an adequate similar agency.

Thursday afternoon's session was devoted to addresses on various subjects.

The first paper covered the "Protection of Life Hazard on Railways by Steel Cars," by R. W. Gibbs, Chief Mechanical Engineer Pennsylvania Railroad Co., supplemented by a letter on the same subject from the Interstate Commerce Commission, Washington.

This was followed by a paper on "Safe Transportation of Explosives and Other Dangerous Articles," by Col. B. W. Dunn, Chief Inspector Bureau for Safe Transportation of Explosives, New York City.

Then followed a paper on "Mine Fires," by H. M. Wilson, Engineer Experiment Station Bureau of Mines, Department of Interior of United States, Pittsburgh.

Then followed letters regarding the "Safety of Ships," by Capt. W. S. Benson, U. S. N. Commandant Navy Yard League Island, Philadelphia; Steamboat and Inspection Service Department of Commerce, Washington; Wm. Cramp and Son's Ship and Engine Building Co.; H. W. Hand, General Manager New York Shipbuilding Co.; H. A. Magoun, Vice President.

Then followed a paper on "Forest Fire Prevention and Control," by Mr. A. F. Potter, Acting Forester, Forest Service Department of

Agriculture, Washington; supplemented by remarks on the same subject by Mr. F. W. Rane, Massachusetts State Forester, Boston.

Then followed interesting remarks on "General Fire Waste Conditions in the United States and Canada," by Mr. A. Lindback, Fire Commissioner for Manitoba, and Ex-President Fire Marshals' Association of North America, Winnipeg, Canada, and finally an illuminating address on "General Fire Waste Conditions in the Country," by Hon. Wm. C. Redfield, Secretary Department of Commerce of the United States, Washington. This concluded Thursday afternoon's session.

Friday morning session—

Topic 11.—"Management."

Papers on this subject were presented respectively by Messrs. Lewis T. Bryant, Commissioner Department of Labor, Trenton, N. J., William H. Loller, Ex-President International Association of Fire Engineers, and Ex-Chief Fire Department, Youngstown, O., and S. G. Walker, Engineer Manufacturers Mutual Fire Insurance Co., Providence, R. I.

The discussion which followed was concluded by unanimous adoption of the following Resolution:—

It is the sense of this convention that—

Based on evidence and opinions obtainable, approximately one half of all fire waste—including avoidable fires without fraud as well as arson fires—arises from ignorant, shiftless, dirty and vicious use of property (which condition causes an approximate like proportion of sickness and immorality in all populous centers) and therefore minimum continuing requirements as to clean and orderly living and the suppression of dangerous, fire-breeding nuisances (such as the snap match, dangerous smoking, careless storage of rubbish, ashes, etc.) should be imposed by law in all communities, through the agency of the police power, acting through state and municipal fire marshals (or like officials), using the active fire-fighting organization for inspections as much as possible and all volunteer aid procurable.

Topic 12.—"Legislation."

Papers on this subject were presented by Messrs. Powell Evans of Philadelphia, and H. L. Ekern, Commissioner of Insurance of Wisconsin, Madison.

The discussion which followed was concluded by the unanimous adoption of the following Resolution:—

It is the sense of this convention that—

While fire loss of life and property is always local in inception, its result is national in effect, and hence its control must be effected by the operation of a sum total of state and municipal laws which will suppress the range of fire hazards to an attainable minimum everywhere and all the time, and that by this course alone can the sum total of fire waste of life and property be speedily and substantially reduced, and the cost of fire insurance (which reflects this total loss) be lessened throughout the country.

Friday afternoon session—

Topic 13.—"Education."

An address on this subject was made by Franklin H. Wentworth, Secretary National Fire Protection Association, Boston.

The discussion which ensued was concluded by a unanimous adoption of the following Resolution:—

It is the sense of this convention that—

Education of the public about fire danger and waste of life and property should be provided in all laws, ordinances and regulations on the subject; and all interests concerned should not only join issue in collecting accurate and authoritative data but make equal effort to disseminate this information regularly and continuously among all the people in readily understandable language, to the end that they may not only accept but demand proper fire waste regulation and live in full accord therewith.

The convention then adjourned to witness a fire drill by employees of the Victor Talking Machine Company, Camden, followed by a river ride on the fire boat City of Philadelphia.

Saturday morning's session—

Topic 14.—"Insurance."

The legal aspect of this subject was presented in a paper by Mr. Francis Rawle, Ex-President American Bar Association, Philadelphia, which was followed by two further papers presented respectively by Messrs. Joseph Baldwin, Fire Marshal State of Pennsylvania, Harrisburg, and Wm. Guerin, Acting Chief Fire Prevention Bureau, New York City.

The discussion which ensued was concluded by a unanimous adoption of the following Resolution:—

It is the sense of this convention that—

(*a*) The several states, territories and provinces should not only assure that permissible fire insurance is stable financially, but that the form of contract should be as clear, brief, explicit and sound as possible and as nearly as may be uniform in substance in all these jurisdictions—to the end that all such policies permitted to issue throughout the country may equally and adequately protect all citizens, including the careless, ignorant and inexperienced; and

(*b*) Said jurisdictions should as nearly as possible adopt uniform regulations governing:

1. Issuance of fire policies on property, and
2. Licensing of fire insurance agents and brokers, and
3. Licensing of fire insurance adjusters, to the end that only reasonable insurance contracts will be permitted on property, and that only men of sound character will be admitted to the business of writing fire insurance and adjusting fire losses—thus discouraging arson and complicity with fraudulent losses.

Topic 15.—"Organization."

This topic took up the continuance of the activity of Fire Prevention and Protection work throughout the United States and Canada.

Franklin H. Wentworth, Secretary National Fire Protection Association, presented plans of that Association to continue and expand this work, outlining the prospective plan of local chapter organizations of that body.

The Convention discussed the possibility of re-convening at the Panama Exposition in San Francisco in 1915, and then adjourned *sine die*.

The convention covered in a remarkably finite way the whole field of fire prevention and protection, expanding far beyond the purely physical questions to those concerning legislation, administration and education.

The convention formally appointed Mr. Powell Evans, Chairman, to edit the record and gave him freedom to finance as large an issue of this as could be effected. All expressed the hope that this finally could be accomplished without commercializing the record in any way by the insertion of advertisements, etc.

Mr. Evans now has a complete transcript of the discussions, aggregating possibly 85,000 words, which with papers in book form would amount to 300 pages 7 x 10 inches, which when thoroughly indexed and cross-indexed will constitute as authoritative a text and reference book on this subject as anything that has ever been gotten together. It will combine the point of view of the National, State and Municipal Officials; Civic and Trade Associations, in addition to the knowledge and experience of the Fire Underwriters.

If 50,000 of these books can be sold at the price of 35 cents (Philadelphia), it will pay the legitimate expenses leading up to and covering the convention as well as the cost of the issue, including the many thousands of these books that will be sent to libraries and officials all over the country.

Mr. Evans reports the following promised subscriptions: From Mr. Wm. Guerin, Acting Chief Fire Prevention Bureau, New York City, approximately 3,000 copies; from Mr. Joseph Baldwin, Fire Marshal State of Pennsylvania, Harrisburg, approximately the same number; from this Association approximately the same number; and numerous orders for 100 copies from business establishments desiring to send them to their customers.

It involves Mr. Evans in material personal financial risk to order this large number of books before the subscriptions have actually been received and paid. It is also impossible to get these books at such a low price unless a large quantity is subscribed. Readers of the QUARTERLY who are interested in the distribution of this valuable document, are therefore invited to send to it, or to Mr. Powell Evans, 517 Arch St., Philadelphia, Pa., subscriptions for any number of copies they can take and use, with all the speed possible so that this book can be gotten out to the public in the near future.

Year's Fire Losses $224,723,350.

Slight Decrease Compared with Previous Year—No Serious Conflagrations During 1913, but Forty-Four Fires each Cause Loss of Half Million or Over—Average Annual Loss for Thirty-Seven Years $152,199,721.

The losses by fire in the United States and Canada during the twelve months ended December 31, 1913, as compiled from the records of the *Journal of Commerce* and *Commercial Bulletin*, reach an aggregate of $224,723,350. While this destruction of property is appalling to consider as a drain on the nation's resources in one year, it is somewhat better than the record of the three preceding years, when the figures were respectively $225,320,900 in 1912, $234,337,250 in 1911 and $234,470,650 in 1910. The first five months of the year 1913 gave promise of a material reduction in the fire waste, but the four summer months developed very serious losses, which more than offset the favorable conditions prevailing earlier.

The fire losses during the year just closed were very generally distributed throughout all sections of the country, and all classes of risks suffered equally. There were no general conflagrations of any magnitude during 1913, the largest fire of any description being a general fire involving several blocks at Hot Springs, Ark., in September, which caused a property loss of about $2,225,000. There were, however, during the year no less than forty-four fires, each of which caused an estimated property damage of $500,000 or over. The causes which have been responsible for the continuation of the comparatively heavy fire waste of the country during the past three years continue to be a matter of study by fire underwriters. The popular movement along fire prevention lines received no little encouragement from legislative and municipal organizations during 1913, and in many states laws are now in force which were enacted in 1912 with a view of diminishing the number of preventable fires. Notwithstanding this fact, however, the destruction of property by fire has shown only a very moderate diminution.

The attempt to prevent a considerable portion of the fires throughout the country by means of a more rigid inspection of buildings with a view of discovering defects before they result in loss has not as yet had time to bear any real fruit, but some of the various state legislators are now more disposed to give the subject of excessive fire waste much more consideration than heretofore, and some good effects may result. The establishment of fire marshals in many states, with full power to investigate all fires of questionable origin, will undoubtedly result in checking some of

the incendiaries. The continued financial and business depression was undoubtedly a contributing factor, as merchants who are having a struggle to keep the balance on the right side are not disposed to incur any expense to prevent a possible fire.

The fire losses in the United States and Canada during the past thirty-seven years reach the gigantic sum of $5,631,389,675, or an annual average of $152,199,721. The following table, giving the losses by years during the past thirty-seven years, discloses the steady general upward tendency of the country's fire waste. It will be noted that since 1906, the year of the San Francisco conflagration, the annual fire loss has continued well above two hundred million dollars:—

1913	$224,723,350	1894	$128,246,400
1912	225,320,900	1893	156,445,875
1911	234,337,250	1892	151,516,000
1910	234,470,650	1891	143,764,000
1909	203,649,200	1890	108,993,700
1908	238,562,250	1889	123,046,800
1907	215,671,250	1888	110,885,600
1906	459,710,000	1887	120,283,000
1905	175,193,800	1886	104,924,700
1904	252,554,050	1885	102,818,700
1903	156,195,700	1884	110,008,600
1902	149,260,850	1883	110,149,000
1901	164,347,450	1882	84,505,000
1900	163,362,250	1881	81,280,000
1899	136,773,200	1880	74,643,400
1898	119,650,500	1879	77,703,700
1897	110,319,650	1878	64,315,900
1896	115,655,500	1877	68,265,800
1895	129,835,700		
Total for 37 years			$5,631,389,675

A comparative record of the fire losses by months during the past three years is given below, as affording a study of the changes which climatic conditions reflect in the average monthly losses. It will be noted that seasons of intense cold weather or protracted dry seasons invariably have a serious effect on the fire loss record. The table below gives the losses by months during 1911, 1912 and 1913:—

	1911.	1912.	1913.
January	$21,922,450	$35,653,150	$20,193,250
February	16,415,000	28,601,650	22,084,600
March	31,569,800	16,650,850	17,511,000
April	17,670,550	16,349,400	16,738,250
May	21,422,000	21,013,950	17,225,850
June	20,691,950	16,103,450	24,942,700
July	25,301,150	15,219,100	20,660,900
August	12,662,650	14,158,800	21,180,700
September	11,333,250	13,779,300	17,919,300
October	13,945,000	13,651,650	14,932,750
November	18,680,600	16,172,300	15,207,600
December	22,722,850	17,967,000	16,126,450
Total for year	$234,337,250	$225,320,900	$224,723,350

A carefully compiled record of the fires credited with causing a property loss of $10,000 or over in each instance shows that there were no less than 3,590 such fires during 1913. This compares with 3,640 fires in 1912 and 3,410 in 1911. The following monthly classification of the fires of $10,000 or over during 1913, according to their destructiveness, affords an interesting comparison.

	$10,000 to $20,000.	$20,000 to $30,000.	$30,000 to $50,000.	$50,000 to $75,000.	$75,000 to $100,000.	$100,000 to $200,000.	$200,000 and over.	Total.
January	142	72	44	45	17	32	13	365
February	115	60	52	35	20	31	18	331
March	109	63	42	42	11	27	13	307
April	98	64	28	34	8	26	18	276
May	96	32	42	24	19	39	15	267
June	110	77	41	38	15	33	24	338
July	113	61	43	38	20	34	19	328
August	95	52	48	41	22	39	15	310
September	126	53	39	28	15	20	15	296
October	104	56	39	31	14	24	9	277
November	87	43	34	30	9	30	12	245
December	101	62	40	30	14	20	13	250
Totals	1,298	695	492	416	182	355	184	3,590
Totals—								
1912	1,278	689	514	433	162	396	168	3,640
1911	1,159	596	525	402	178	352	189	3,410
1910	1,098	594	450	371	196	324	192	3,225
1909	1,128	570	457	444	174	337	160	3,270
1908	1,644	754	587	407	192	339	145	4,068
1907	1,671	764	547	420	209	299	154	4,073
1906	1,399	663	477	360	163	252	125	3,439
1905	1,326	657	502	367	152	258	101	3,363
1904	1,180	595	482	328	173	233	106	3,100
1903	1,040	493	381	380	171	218	106	2,680
1902	821	438	335	342	135	210	119	2,400

The fires during 1913 which caused an estimated property damage of half a million dollars or over each numbered forty-four. These fires are given in brief below:—

Chicago, Ill., business block	$500,000
Calgary, Alberta, meat packing plant	910,000
Savannah, Ga., wharf and railroad property	1,100,000
Craigmont, Ont., corundum mills	500,000
Quincy, Ill., tablet works and paper plant	500,000
Columbus, Ga., cotton compress and others	940,000
Argenta, Ark., cotton compress	500,000
Hot Springs, Ark., six business houses	500,000
Vandalia, Ill., roofing factory	582,000
Dayton, O., several business houses	500,000
Everet, Wash., iron works	500,000
Chicago, Ill., packing plant	500,000

Lansing, Mich., twine factory	$500,000
Grenta, Man., hotel and business block	600,000
Buffalo, N. Y., grain elevator and other	500,000
Springfield, Mo., buildings in public square	700,000
Prince Albert, Sask., lumber plant	500,000
Chicago, Ill., tanning plant	500,000
Welland, Ont., courthouse and other	500,000
Long Island City, N. Y., paper box plant and other	1,000,000
Buffalo, N. Y., flour mill and grain elevator	610,000
Dee, Ore., sawmill and lumber	500,000
Montreal, Que., church building and other	500,000
Michigan City, Ind., car factory and other	750,000
Indianapolis, Ind., hardware store and other	500,000
Weymouth, Mass., chemical plant	500,000
La Grande, Ore., lumber yards	500,000
Bangor, Pa., iron foundry and other	750,000
Athabaska, Alberta, general store	750,000
Jersey City, N. J., cooperage and other	540,000
Teague, Tex., railroad shops	500,000
Bay Point, Cal., lumber yards	575,000
Hot Springs, Ark., conflagration	2,225,000
Bopohoma, Okla., lumber plant and village	500,000
Chicago, Ill., boiler shop and others	500,000
Buffalo, N. Y., coffee warehouse and others	500,000
Kansas City, Kan., flour mills and others	600,000
East St. Louis, Mo., railroad terminal and grain elevator	600,000
Milwaukee, Wis., rubber works and others	500,000
Philadelphia, Pa., chair factory and others	500,000
Akron, O., business block	500,000
Port Huron, Mich., railroad shops	750,000
New York City, glove factory and other	830,000
Cohoes, N. Y., knitting mill and other	596,000
Peoria, Ill., storage warehouse	660,000

Monitor Nozzle Protection for Lumber Yards.

By "C. F. U. A.," Montreal (Member N. F. P. A.)

Some time since a request came from the editor of the QUARTERLY as to the experience in the Canadian field with monitor nozzles for the protection of lumber yards. Correspondence with various underwriting and other interests confirmed the writer's impression that the monitor nozzle had been used very little in Canada for such protection. Through the correspondence, however, and from tests made at the Angus Shops of the Canadian Pacific Railway, Montreal, information was secured which may be considered of value, and is, therefore, described.

The suggestions given are not to be taken solely as the writer's, but as his understanding of the prevailing opinion from the various sources, and are not considered as conclusive, but with a view to further expressions on the subject from those interested.

Opinions quite at variance are held by those whose judgment in such matters is highly regarded. Some believe that as hose streams are more flexible, they are more effective, particularly for a fire at the base of a lumber pile; and that a portable deluge set, permitting of the use of a large stream by means of connections from two or three lines of hose, is more serviceable than a monitor nozzle. Cases have also been cited where lumber yard fires have been fought by use of hose streams from behind either permanent barriers, such as fences, or temporary shields formed by holding up lumber. Others contend that a monitor nozzle system properly laid out would act as a water curtain to isolate a lumber pile, and confine a fire, if discovered at the start, to the seat of origin.

Tests of the monitor nozzles at the Angus Shops, Montreal, on October 7th and November 24th are given in detail. The tests on the latter day were more extensive, as it had been ascertained that Secretary Wentworth was to be in Montreal, and the Canadian Pacific Railway officials readily responded to a suggestion for tests in his presence. In fact, the program was considerably augmented from that at first contemplated, and the occasion designated as "National Fire Protection Day."

A description of the other exercises is not properly a part of this article; but it would be discourteous to the Canadian Pacific Railway officials not to mention their hearty co-operation at the tests. Some twenty-five men of the private fire brigade were kept on duty, and every

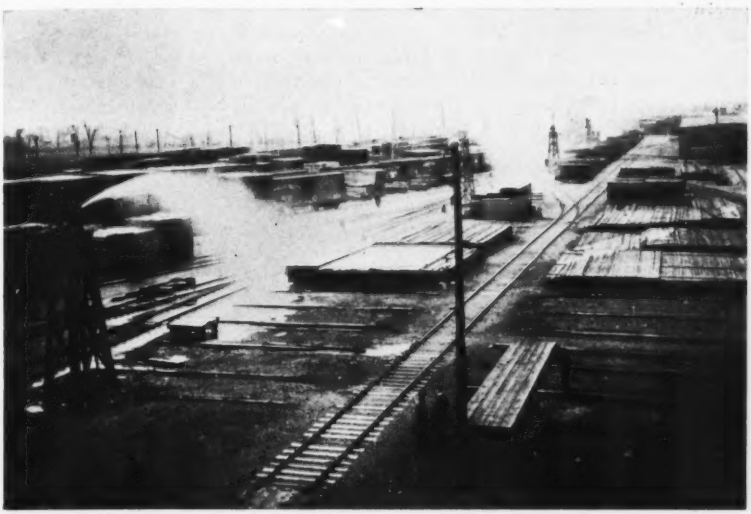
facility was offered. The fact that all of the water discharged was metered should also not be overlooked.

There are six monitor nozzles at the shops, spaced some 240-250 feet apart, running in nearly a straight line from west to east, and connected to the yard mains.

Monitor Nozzle tests at Angus Shops, Montreal.
(Manager C. L. Scofield and Secretary Wentworth.)

Five of the nozzles are on an 8-inch main, fed at either end by 10-inch, in turn supplied by 12-inch, and the remaining one (No. 3) is on a short dead end of 8 inches, 200 feet to 12-inch. Each nozzle is fed by a 6-inch connection ranging from 25 to 50 feet in length, and reducing to a short run of 4-inch at post indicator valve to the overhead pipe, which is 3½ inch for the height of the trestle, 20 feet.

The water supplies at the shops are above the average, consisting of a 12-inch connection from a 12-inch high level city main, 100 pounds



Monitor Nozzle tests at Angus Shops, Montreal.

Monitor nozzles 3, 4, 5 and 6 are shown. Nos. 1 and 2 were in action at the same time (6 in all) but were back of the camera. An unusually light stock of lumber on hand at the time of test.

static pressure, and two Underwriters' steam fire pumps with a total capacity of three thousand (3,000) U. S. gallons per minute, draughting from a large private reservoir. The only retarding feature is that the city supply comes through meters, there being three 8-inch meters of a English turbine type in parallel. At the tests, no attempt was made to display the nozzles at their best, the water supply being ample, but the object was to ascertain their value under average conditions. For this reason, on November 24th, the city supply was shut off for the first two tests, and two nozzles only used, with pump supply, based on a static pressure of approximately 50 pounds, later increased to 75 pounds. The pumps were then shut down and the whole six nozzles tried with the city supply only. The horizontal distances covered by the streams were greater than those designated as the effective reach of fire streams published on page 26 of "Fire Engine Tests and Fire Stream Tables" of the National Board of Fire Underwriters, and based on the John R. Freeman tables; and less than the distance claimed in the circular of the nozzle manufacturer for pressure of 80 pounds. Unfortunately, on both days of the tests, there was no wind, so the retarding effect of that agency could not be computed.

In all tests the horizontal distances covered by the various discharges were staked and measured by tape, while the nozzle pressures were taken by Curtiss Fire Stream gauges on both nozzles on November 24th, when two were in test, and on nozzles Nos. 1, 3 and 6 when all six were in

operation. Pressure gauges were also located at hydrants Nos. 32, 33 and 35, some 50 to 75 feet distant from nozzles 1, 2 and 3 respectively, and also at hydrant No. 37, 200 feet beyond monitor nozzle No. 6. All gauges had been calibrated just prior to the tests. The size of all tips or orifices was 1¼ inches, except for monitor nozzle No. 1, which was 1⅛ inches.

Tests October 7th, 1913. Monitor Nozzle No. 3.

Size of orifice 1¼ inches.

Static pressure at hydrant No. 35, 50 feet from nozzle.	Water flowing pressure at hydrant during test.	Pressure at monitor nozzle.	Gallons discharged. (U.S.)	Horizontal distance covered. Effective	Horizontal distance covered. Extreme	Effective reach for nozzle for this pressure, Freemantables.	Distance claimed by Manufacturer.
108 lbs.	98–100 lbs.	80 lbs.	410	175 ft.	150 ft.	84 ft.	203 ft.

Tests November 24, 1913.

First test. Static pressure of approximately 50 lbs., Monitor nozzles Nos. 3 and 4.

Static pressure at hydrant No. 35.	Water flowing pressure at hydrant during test.	Pressure at monitor nozzle No. 3.	Gallons discharged. (U.S.)	Horizontal distance covered. Extreme.	Horizontal distance covered. Effective.	Effective reach for nozzle for this pressure. Freeman tables.
60 lbs.	55–40 lbs.	32–24 lbs.	261–226	99 ft.	75 ft.	53–45 ft.
		Pressure at monitor nozzle No. 4.				
		29 lbs.	250	98 ft.	75 ft.	50 ft.

Total U. S. gallons discharged per minute from both nozzles 510–475.

Second test.

Water flowing pressure at hydrant No. 35.	Pressure at monitor nozzle No. 3.	Gallons discharged. (U.S.)	Horizontal distance covered. Extreme.	Horizontal distance covered. Effective.	Effective reach for nozzle at this pressure, Freeman tables.
75–66 lbs.	46 lbs.	313	122 ft.	98 ft.	66 ft.
	Pressure at monitor nozzle No. 4.				
75–66 lbs.	40 lbs.	292	122–123 ft.	97 ft.	62 ft.

Total U. S. gallons discharged per minute 605.

Third test.

City pressure only 100 lbs. static. Monitor nozzles Nos. 1 to 6 inclusive.

Nozzle No. 1, 1⅛ inch orifice, all others 1¼ inch. Curtiss fire stream gauges on nozzles Nos. 1, 3 and 6.

Water flowing pressures at hydrants during test.

Hydrant No. 32, 59 lbs.
" 33, 55 lbs.
" 35, 60 lbs.
" 37, 60 lbs.

	Pressure at Monitor Nozzles.	Gallons discharged. (U.S.)	Horizontal distance covered. Extreme.	Effective reach at this pressure as given by Freeman tables.
No. 1	35–40 lbs.	220–237	104 ft.	54–59 ft.
No. 2			139 ft.	
No. 3	40 lbs.	292	Marker removed before distance was measured.	62 ft.
No. 4			123 ft.	
No. 5			127 ft.	
No. 6	41 lbs.	295	116 ft.	62 ft.

Total gallons discharged per minute, estimated 1,700.

On inclining a monitor nozzle downward as far as it would go, it was found that the water struck the ground 21 feet from the trestle, showing a clear space of not less than 20 feet should be maintained from trestles to lumber piles for this style of trestle and nozzle.

Fourth test. Monitor nozzle No 3, city pressure only.

Water flowing pressure at hydrant No. 35.	Pressure at monitor nozzle.	Gallons discharged. (U.S.)	Horizontal distance covered. Extreme.	Effective reach as given by Freeman tables.	Distance claimed by manufacturer.
102 lbs.	78 lbs.	407	203′6″ striking side of a building.	83 ft.	203 ft.

Hydrant Tests

October 7, 1913, 50 feet of new C. R. L. hose, 1⅛ inch Underwriters' play pipe attached to hydrant No. 35. Curtiss fire stream gauge showed nozzle pressure of 75 to 78 pounds. Gallons discharged, 325.

Extreme horizontal distance covered, 175 feet. Effective, 150 feet.

Effective reach of hose stream with moderate wind, at this pressure, by Freeman Tables, 79 feet.

November 24, 1913, 150 feet new C. R. L. hose, 1⅛ inch Underwriters' play pipe attached to hydrant No. 35. Curtiss fire stream gauge showed pressure of 58 pounds.

Gallons discharged, 285.

Extreme horizontal distance covered by stream, 150 feet.

Effective reach with moderate wind, at this pressure, by Freeman Tables, 70 feet.

The only other test of monitor nozzles available to the writer is that furnished by the Otter Creek Boom & Lumber Company, Hambleton, W. Va., who give the following figures:—

Size of orifice $1\frac{5}{16}$ inch.

Effective horizontal distance of stream 175 feet, 95 pounds static pressure, 4-inch connection from 8-inch main. Height of stand, 8 feet.

It is understood that the General Fire Extinguisher Company are to make extensive tests showing the effective reach of monitor nozzles under varying conditions.

As will be seen, the distance covered by the hose streams nearly, if not quite, equalled that covered by the nozzle streams. If the effective reach of monitor nozzle streams is to be computed on the same basis as hose streams, the nozzles would have to be placed closer together than hydrants, and so many would be needed, that the cost of such equipments would be prohibitive for the general run of lumber yards. A tentative plan of a lumber yard with monitor nozzles spaced 90 feet apart and lumber piles 20 feet high, has been prepared by one of the insurance bureaus, and while it would undoubtedly give good protection, in this field, the lumber yards generally contain the cheaper grades of wood, such as pine and spruce, and unless further tests should develop that a considerably greater spacing could safely be used, it is not believed that such protection would be largely considered on account of the expense.

At the Angus Shops the spacing of 240-250 feet was arrived at after tests with the first nozzle installed. The reach of a nozzle was figured as 125 feet, and there is ample hydrant protection in addition.

A monitor nozzle to be of value needs an ample water supply at a good pressure. Where a lumber yard forms part of a plant of large value, as, for instance, car shops with car storage also in the yard, it is believed that monitor nozzles would be a valuable adjunct to the fire apparatus as a supplement to the hydrants, constitute a water barrier between the lumber and cars and valuable buildings, and would be less likely to be obstructed by cars, especially moving ones.

A monitor nozzle has also a decided advantage over a hose stream in another particular, and that is, requires practically but one man to handle, and can be so arranged that even if abandoned it will still discharge in the direction of a fire. As a summary, the following suggestions are offered, based on the statements outlined above.*

1.—Height of Lumber Piles. To be limited to 20 feet. The space between piles to be governed by local conditions; but in a very large lumber yard there should be several clear spaces of not less than 200 feet, if possible.

*Acknowledgment is made to the Factory Mutual Laboratories, General Fire Extinguisher Company, Insurance Bureau of the American Electric Railway Association, New York Underwriters' Agency, Nova Scotia Board of Fire Underwriters, Mainland Board of Fire Underwriters of British Columbia, Otter Creek Boom and Lumber Company, James Shearer Company, and Western Canada Fire Underwriters' Association, who have furnished information, either direct or through others.

2.—Patrol. Yards to be constantly patrolled with watch boxes installed, so that a fire may be discovered, if possible, in its incipiency.

3.—Height of Trestle. Approximately 20 feet, nozzle to extend above same several feet. Trestle to be sufficiently high so nozzle will be above the lumber piles it is to protect, and have a clear sweep on all sides.

4.—Material of Trestle. Substantial wood frame recommended, as it will stand until nearly burned through and deemed safer for the operator, as metal supports would heat up quicker, or buckle under a severe heat. This might not apply to an upright pipe that would be filled with water.

5.—Clear Space to be Maintained around Nozzles. Lumber not to be piled inside of the effective range of the nozzle from platform. This would require a clear space of about twenty feet.

6.—Spacing of Nozzles. Will depend upon water supply and other local conditions. Distance on straight runs to be governed by the effective area of the streams, that is, if the discharge will cover effectively 100 feet the distance between nozzles to be approximately 200 feet, so the discharge from two nozzles on the same line will cross, allowance being made for the retarding effect of a wind. In other words, the spacing to be somewhat less than the combined effective area of two nozzles. Nozzles to be also so arranged that any one pile can be surrounded with an effective water curtain to confine a fire to same; or to form an effective water shield between lumber and buildings. This could be done by placing them in parallel lines, either equi-distant or staggered.

7.—Size of Orifice, or Tip of Nozzle. Minimum to be 1 1-8 inches; as much larger as the capacity of the water supply will permit, figuring four streams in operation at one time.

8.—Diameter of Supply Pipe. Need not exceed four inches on upright or exposed pipe above the ground level. Size of underground mains to be governed by local conditions, that is, the number of nozzles and the capacity of the water supplies; but on short runs (not exceeding 50 feet) to end nozzles, might be four inches, but not more than one nozzle to be supplied by 4-inch pipe. All pipes to be properly arranged to drain where exposed to freezing.

9.—Underground Mains. Sizes to be governed by the number of nozzles and the sizes of the discharge outlets on same.

10.—Controlling Valves. A post indicator valve to be provided to control each monitor nozzle, and a large yard to be divided into a number of sections controlled by post indicator valves. It might be possible, by the use of an extension rod, to control the valve for each monitor nozzle, from the level of the platform, so that the operator could turn on the water from the platform; but this advantage would probably be offset by the danger of bending or breaking such a long rod.

11.—Advantages and Disadvantages of Monitor Nozzle over Hydrant Stream.

Advantages.

(*a*) Requires but one man to put it in service.

(*b*) Can be put in service much quicker than the ordinary hose stream.

(*c*) Can be abandoned and arranged so it will still discharge water in the direction of a fire.

(*d*) Gives a more effective stream for same sized orifice on account of larger supply pipe.

Disadvantages.

(*a*) Is in a fixed position and cannot reach a fire near the base of the middle, or the far side of a pile.

(*b*) Greater cost over hydrant and equipment, which would be materially increased if nozzles require close spacing to be effective.

Latest Devices for Forest Protection.

By E. T. Allen (Member N. F. P. A.)

Forester Western Forestry and Conservation Association.

A truth less realized in America than in older countries is that forest industry is in the final analysis an entity. Man needs wood in various forms. To make the earth supply it, adding such labor as is required to make it available and suitable for his use, is a business. Convenience may require that it be conducted by one unit of management, as when the small mill cuts its own timber and retails to local consumers; or by several, as when timber, logging, manufacturing, jobbing, transporting and retailing are each under separate proprietorship. But although the latter system may produce some conflict of interest between its units, it cannot possibly destroy the greater mutual interest of all branches of one business. In the long run the prosperity of all has a common basis and this must include perpetuation of the resource dealt with, economy in every process, and just payment by the consumer for the services rendered.

The co-operative patrol movement in the Pacific Northwest has had phenomenal growth. It is only about seven years since the first protective association was formed by a few timber owners in the Coeur d'Alene district. Their plan did not go beyond cheapening and improving a local fire patrol. Now there is a chain of similar associations from the Montana Rockies to Northern California, patrolling over twenty million acres, employing many hundred trained men, and spending hundreds of thousands a year. They protect about 500 billion feet of timber, or a fifth of the nation's entire supply, and keep the loss down to so negligible a figure that it can hardly be expressed in terms of percentage.

In 1913 so effective a record was made by these protective associations that, with about average weather danger to contend with, a total destruction of timber by fire of only about three million feet (worth less than $5,000) occurred, against the previous lowest record of twenty-six million feet in 1911.

State and government protective agencies report equal success. There has been practically no loss in the national forests. Damage to logs and camp equipment by slashing fires is also the lowest on record, being estimated at $10,000.

Review of the season's hazard in the Pacific Northwest by all agencies shows that while it at no time over-taxed protective organization, this was due to improvement in the latter rather than to unusually favorable weather. The year is reported to have been much safer than 1902

and 1910 and perhaps a little safer than 1911, but worse than 1912, and about like the average of others in the past. About 2,500 fires worthy of report were extinguished by the combined patrol forces. There were many dry hot periods during which these might have been highly destructive if not promptly handled. It is commonly estimated that before patrol work became organized in the Pacific Northwest the average loss was well over a billion feet, occurring in just such years as 1913 because countless small fires were neglected to be fanned up in hot windy days.

Co-operative patrol has proved so successful that even in these few years it has established a wholly new channel for the direction of public forest protection policies, state and federal. Once almost regarded as disciplinary and directed at lumbermen, necessarily originated and executed without consulting their interest, forest legislation is now mainly along the lines of strengthening a team relation between lumbermen and official agencies, one which shall utilize private interest and competence to the utmost. The associations have legalized official standing as representatives of the state or government. Whereas at one time the effort was to collect from forest owners funds to be expended by public officials, it is now rather to discover ways in which private protective systems can serve as the most efficient agencies for public expenditure. They are also consulted as to punitive laws and constituted a constabulary to enforce them. I sometimes wonder whether the true significance of this change is realized. It means that those Coeur d'Alene men unwittingly discovered a gate through which forest industry is passing the barrier of public misunderstanding and distrust to take its rightful place in the community as a useful and commendable industry. Certainly it has not its rightful place until its voice is welcomed and respected in all men's councils that affect its welfare. To have such a voice in strictly protective affairs is not so old nor trifling a thing that we should accept it without gratification. It is infinitely more important that it is also the voice of all forest industry, earning an influence in all affairs that affect the lumberman, whether the making and enforcing of laws or of that which is greater than law—public sentiment.

When the extending and improvement of co-operative patrol became of recognized importance, the pioneer associations allied in the Western Forestry & Conservation Association to maintain facilities for this purpose and also for carrying on a campaign of public education in the fire evil, so there might be fewer fires to find and fight.

Never in history has there been such rapid advance in technical methods as since our state, federal and private fire fighters have attacked the problem jointly with full knowledge of each other's inventions and a friendly spirit of rivalry. Co-operation has removed the tendency to regard each other as impractical and consequently to disregard differing theories.

In reviewing progress during the past year perhaps the most notable innovation is the Oregon compulsory patrol law, enacted last winter.

Every timber owner must maintain a patrol as good as do fifty-one per cent of his neighbors, or the state may do the work and collect a maximum of five cents an acre in the same manner that taxes are collected. The state forester has platted the entire private ownership of the state, and of those not already doing good work, requires that they install patrol or join an association. He encourages the latter course. There has been surprisingly little objection to the law and so far no necessity of state action. Although to learn ownership and get things going has taken much of the season, about three thousand owners are now paying into the associations for the first time. The state also contributes to these associations.

As before stated. 1913 was a comparatively easy season, judged by modern standards, for losses were negligible. We must not forget, however, that this was not all due to the weather. In old days as much dry, windy weather as we had this year always did much damage, for there were countless smouldering fires for it to fan up, and no machinery for jumping on them. It means that protection is so good now that we don't have to worry except in a very bad year. But the bad year will come and there is none the less need for constantly strengthening our defense to meet it. A good year gives just the chances needed for perfecting details we cannot touch when overworked.

Consequently this season has seen much progress in telephone and trail building and particularly in equipping lookout stations. There is increasing use of men for this purpose only with facilities for taking and communicating cross-bearings on fires so that other men can be sent to the exact spot without delay. Some of the results have been remarkable, locating a distant fire on the exact forty. This work is done by use of good maps and carefully oriented protractor dials; much as courses are laid on a ship's chart. Portable telephones are found useful by mounted patrolmen, but there is no less need for permanent lines, and these are being better built than before. The Forest Service in particular is also doing much experimenting with specially weather and bullet proof instruments.

Portable wireless is not yet in use with us, but its probable value as an auxiliary to trunk telephone systems, especially in rough country or at large fires, is causing considerable experiment and next year is likely to see field tests.

Among experiments with tools, one likely to interest loggers is a gasoline fire engine built by the Forest Service for use around camps or elsewhere that water is obtainable. Costing but $200 it is said to deliver 25 gallons a minute through 1,000 feet of 2-inch hose with a 150-foot rise.

We have all long known that our greatest fire danger lies in the hot dry interior wind known all over the Pacific Coast under different names. It is a "Chinook" in spring or winter; in summer the "east wind" of the Cascade region, the "norther" of California and east of the Columbia basin is likely to be deflected eastward up the Idaho mountains. It has caused most of our disastrous sweeping fires and, as our facilities for

handling ordinary conditions are becoming adequate, constitutes our great future hazard. A city fire department may seem perfect, but an earthquake may burn a San Francisco, and no forest region subject to a wind like this is wholly immune from a Hinckley, Gaudette, or Coeur d'Alene forest fire calamity.

The Weather Bureau, the Forest Service and the Western Forestry & Conservation Association have just inaugurated a study of the possibility of accurately forecasting this wind and distributing the information to loggers and protective agencies so that if conditions warrant camps can be shut down, burning delayed or other precautions taken. Generally speaking, it should be simpler than most weather predicting, for the conditions producing the wind are interior, not at sea, and can be observed. They consist of a high pressure area in upper British Columbia or Alberta coincident with a low pressure area in the California region, causing the flow from one to the other of a violent interior air current which carries no moisture and is consequently exceedingly drying.

Theoretically, all that is necessary to forecast this is promptly reported barometrical readings from both regions, and we have taken steps to secure the co-operation of the American and Canadian weather officials in this respect. Practically there may be difficulty in getting proper reports from the sparsely settled portion of the northern area and also in calculating local exceptions to the general current. Certain parts of our territory are affected by such a wind under general and determinable conditions, but others may have the general wind diverted by other pressure areas or be subject to dry winds caused wholly by the latter. Until these questions have been further studied it is hardly wise to attempt systematic forecasts, for mistakes in the beginning would brand the project as impractical and only annoying. But we hope that by next season something will come of the investigations being made by District Forecaster Beals, in charge of the Portland Weather Bureau office, who has been authorized to work it out if possible. I may say here that some of the Idaho patrol associations are also experimenting with local barometer readings.

This was not so good a season as hoped for slash burning, but a great deal has been done, experience has been gained, and belief in its advisability strengthened. There has been a marked tendency to tighten up on summer burning and burning without permit. We are realizing that the slashing is our greatest menace. There has never been a year in which slashing fires were checked so quickly and watched so carefully until rainfall. There has been quite wide adoption of campfire rules, specifying in print the responsibility of all employees and emphasizing that preventing fires comes before getting out logs. The experiment will probably result in improved rules next year.

If there is anything needed in the average camp, especially now that the woods are full of patrol men, it is a clear understanding of the foreman's responsibility for fire. He cannot be blamed if, considering getting out logs the work upon which he is judged, he is reluctant to let

anything interfere with it. His duty when this involves fire risk, both individually and in relation to the demands of fire wardens, should be most clearly laid down by his employer. Given such an understanding he often has the best possible judgment in the premises, but not always. Sometimes he does not know so much about fire risk as a specially trained fire warden. Whichever the case, the responsibility should be fixed in advance.

I do not think the time far distant when every logging camp will have a fire plan, as specific as the safety equipment and drills aboard ship, including not only every safeguarding appliance and the movements of the men in case of fire, but also precautionary planning of all operations. We do this with a mill. It is far more important with the material that supports the whole industry.

The protective branch of forest industry is no longer merely the patrol of mountain slopes by the owner. While he is reducing that end of it to a science, protection is in the nature of things being forced to serve more and more as the interpreter between all forest industry and the public, and to remove every hazard for which the industry itself may be held responsible. It must deal more and more with the logger, and needs not only his support but also his technical thought and advice. We are all in one business and it pays to safeguard it. It is also more or less the public's business, and if we don't protect the public it may take a hand in ways to make us regretful. The more sincerity and ingenuity we all devote to forest protection, in field and camp, the sooner will lumbermen as a class reach a position where their voice will be welcomed as that, not of greedy acquirers and destroyers of trees, but of most useful servants of the commonwealth, deserving its reward for fostering and furnishing one of life's essentials.

Hydrant Supervision in Undrained Soil.

By "C. F. U. A.," Montreal (Member N. F. P. A.)

The Association's standard recommends that a certain amount of loose material, such as small or broken stones or gravel, be placed at the base of a hydrant to facilitate drainage. If the soil retains water and the above means is not suitable, the sewer or ground drains should be utilized by connecting the hydrant drain to them through a small cast-iron pipe. A good arrangement in such cases, especially where there is only a slight difference in the levels between the hydrant and the ground drains, is to construct a waterproof vault, preferably of concrete, at the base of the hydrant: the vault to be approximately four to six feet square and not less than four feet deep, and fitted with either a double cover or with earth covering where a considerable depth is required to safeguard against frost, a man hole being left in top of vault. The vault itself should

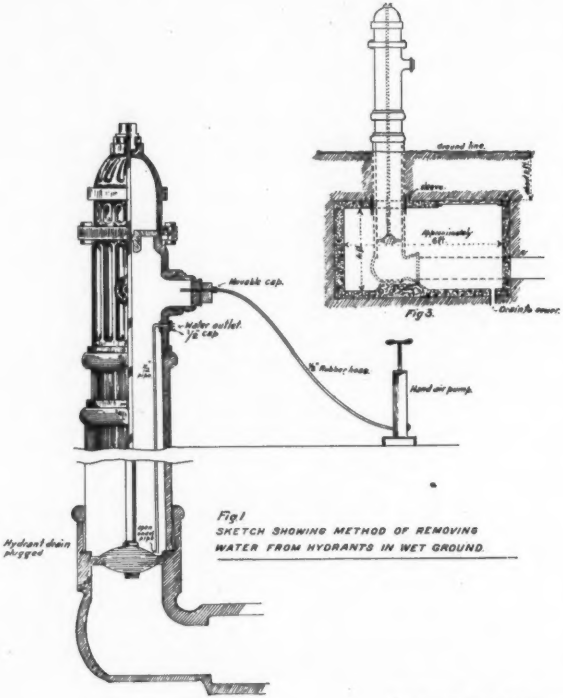


Fig 1
SKETCH SHOWING METHOD OF REMOVING WATER FROM HYDRANTS IN WET GROUND.

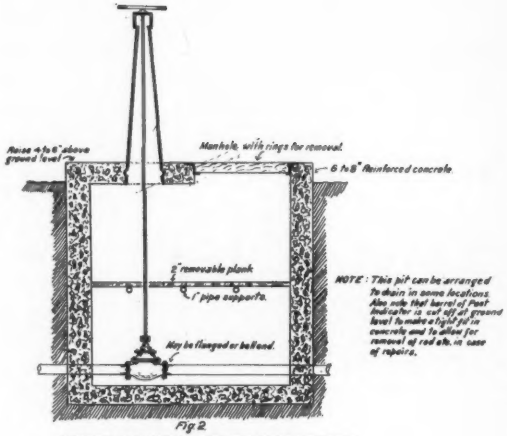

Raise 4 to 6" above ground level
Manhole, with rings for removal.
6 to 8" Reinforced concrete.
2" removable plank.
I pipe supports.
May be flanged or bell end.
NOTE: This pit can be arranged to drain in some locations. Also note that barrel of Post Indicator is cut off at ground level to make a tight joint in concrete and to allow for removal of rod etc. in case of repairs.

Fig 2.
SKETCH OF CONCRETE PIT FOR POST INDICATOR VALVES TO ALLOW FOR REPAIRS &c
—This can also be used for hydrants as in Fig 3.

CANADIAN FIRE UNDERWRITERS' ASSN.
SPRINKLERED RISK DEPT.
No Scale. JULY 1913.

Hydrant and Valve Protection from Frost.

be connected with the sewer or ground drain through a two-inch cast-iron pipe and a trap also provided where connected with sewer. After use, the hydrant drains quickly to the vault and the latter to the sewer or ground drain. Some hydrants are so arranged in Montreal.

There are, however, both municipal and private hydrants which are so situated that it is impracticable to arrange to drain them automatically, and the hydrant barrels have to be cleared of water by some other means to prevent their freezing in cold weather. A large plant in Canada has satisfactorily solved the difficulty by the following method:—

The hydrant drain is plugged, a half inch hole tapped a few inches below the nose outlet and a half inch pipe with elbow inserted in the barrel, the pipe extending down to within a fraction of an inch of the hydrant valve when shut. The outlet of this half inch pipe is normally closed with a screwed cap. A separate hydrant cap is tapped with a half inch outlet and connected by means of rubber hose to a hand air pump. The practice is to attach the connection from the air pump to one of the hose outlets, remove the covering from the half inch pipe above described, and by pumping air into the hydrant barrel force out any water there may be in the same. The plant referred to has some seventy-five private hydrants and they are tested daily in the above manner during cold weather. In addition, there is a vault about four feet square and four feet deep around each hydrant, top of vault level with the ground and covered with an iron plate, the vault being filled annually with fresh manure as a further precaution against freezing.

Plugging the hydrant drain is not to be encouraged, as it is not good practice generally speaking, and all reasonable means should be used to have the hydrants drain automatically. There are situations, however, in which this cannot be done, and with proper supervision the method above described seems to meet the contingency, and is certainly preferable to having the hydrants freeze.

While not a requirement of the underwriters, it is not an uncommon practice in the vicinity of Montreal to construct vaults or pits at the base of hydrants and post indicator valves to facilitate both drainage and repairs, and in some cases the vaults are filled annually with manure as an added protection. The accompanying cuts illustrate the conditions described, and where an owner is willing to take the added precaution, the methods outlined may present themselves as good ones to the readers of this article, or serve as a basis for some other suitable solution.

Building Laws and Their Disastrous Influence Upon Tall Buildings.

By Frederick Lee Ackerman.*

An article, "The Future Skyscraper," published by Mr. David H. Ray, Chief Engineer of the Bureau of Buildings of New York, in *Building Progress*, opens a discussion, since it represents a view quite generally held or accepted by the public, the engineering profession, and not a few architects as well.

In this article Mr. Ray reviews the comparatively short history of the skyscraper in New York, and he shows, by extremely interesting graphic charts, the accelerating growth, not only in the height of the buildings, but also the total stories erected during the years from 1875 to the present date. From these charts he suggests the probabilities and possibilites of the future. He also discusses the attitude of the architect toward this problem of tall building construction. There are many statements made, both regarding the future growth and the attitude of the architect, which may well be examined and questioned.

In commenting upon the architectural aspect of the modern city he says:—

"Here, strange as it may seem, time, space, and the eternal verities steal into one's thought as one gazes o'er land and sea for sixty or one hundred miles, and then looks down on the ant-like specks below. The poetry and democracy of the skyscraper we must leave to the poet and commentator of the future, confident that, when our cities are as old as Venice and Florence, our buildings will be one of the wonders of the world, and that the softened record of time, forgetting the harshness, the strife of the moment, will speak but of the greatness, the glory, the indomitable energy and aspiration of the present hour."

"The tall building has succeeded thus far on its merits, which is a typical American proposition. Yankee ingenuity has evolved the best building in history. The practical man and the scientist have each contributed his best efforts to its success."

After stating how easy it would be for us to outdo the Eiffel Tower, we find this paragraph:

"As for the architecture, the architect must rise to the demands and possibilities of the hour. The dominant Americanism shines forth in many of the older tall buildings despite the drapery of dead forms of the Old World architecture with which they were covered."

*Journal American Institute of Architects.

"Because a sensible Greek or Goth made a thing of beauty out of a water spout by carving it into a lion's head or a gargoyle, must America forever have copies of these strewn over her buildings? The poverty of imagination and inspiration with which some of our architects have responded to the Gift of Time, in the skyscraper, is pitiable. Long have they been in learning that art is not something apart, but is the caress of an aspiring imagination to the work of the hour."

And concerning the future he continues:

"In the future the tall buildings will, no doubt, continue to maintain their supremacy in scientific safety and convenience, and when interest revives in the height record, after a period of rest, no doubt they will go higher still in the form of towers. Now that the scientific side of their development is highly perfected, one may naturally expect to see an effort to make them marvels of art as well as of scientific construction."

"To achieve this, the architect must give way to the engineer, or must once more gain the common touch, must know processes and products, the vital energies, the laboratory, even the dust of the trades, as did Phidias, Angelo and Leonardo da Vinci."

"Then may be expressed the possibilities, the aspiration, the genius of his period; the transplanted architecture of Europe will appear exotic, and America come into the heritage of time and of the ages—American Art, virile, true, fundamental as the life-processes of the nation, characteristic as the glories of her predecessors in the pageant of history."

"Then will the tall buildings of the future take place not only among the world's greatest feats of engineering, but become also worthy monuments of the life of their time, become works of art and take rank with the greatest architecture of the past."

I have quoted thus at great length in order that I may show clearly a very common point of view held by the public at large.

Let us now consider how unimportant and secondary in their nature are all of these problems about which he speaks, when compared to the great fundamental one which embraces the development of our American cities. Are the problems he considers in any sense the vital ones? Are these the basic problems, through the solution of which we may hope to develop a great architecture?

Let us consider first the attitude of the architect. Mr. Ray says, "Let the architect who deplores modern conditions but turn to the pages of the lives of such as Michael Angelo." Is it not pertinent to ask what are the "modern conditions" which the architect deplores? Is it the condition that has resulted from the use of steel as the structural element of support that he does not like? Does he object to the tall building of itself? What is it? In this article Mr. Ray implies that the architect does not take kindly to the skyscraper, because he finds it a difficult problem from the esthetic point of view. This is true, absolutely true, but this statement must needs be qualified by further statements to make its meaning clear.

The thoughtful architect deplores the erection of tall buildings in any

city, whose plan is based upon the assumption that comparatively low buildings will border the streets. There must be a corresponding evolution in this idea of plan arrangement to keep pace with the evolution in construction if he is to be satisfied. He deplores the erection of tall buildings in any city, just so long as the laws and ordinances governing their erection are based directly upon the laws and ordinances governing the erection of buildings of masonry. There must be a full acknowledgement of this new material in our laws before he can respond. He deplores the loss of light and air which is the direct result of the laws not having kept pace with progress in the art of construction. He deplores the utter disregard for adjoining property that obtains through these same laws. He deplores such unscientific and uneconomic conditions, for he looks to the future, when there shall have been erected over vast areas, lofts, factories, office buildings and apartment houses, diminishing the light and air within the buildings, and congesting the streets to a degree that will become nothing less than intolerable.

In this article of Mr. Ray's these huge buildings are called "scientific"—"dollars scientifically invested;" they are spoken of as a "typically American proposition." If a city block covered with buildings, the cube of which comes up to the limit allowed by our present laws and ordinances, can be called scientific, if any part of it can be called scientific, then I ask what in the name of sense is this thing called science?

From the architect's point of view it would be far more scientific to acknowledge the fixed elements of the problem, viz.: The city street of say sixty feet in width, the city block of say two hundred feet by four hundred or six hundred feet, and the natural laws of light, shade and air, and then to erect upon the block buildings in such a fashion and in such a manner that there would be ample light and air for all workers and tenants within the buildings upon that block, and something else than gloom within the streets. It would be scientific to frame laws and ordinances so that such a condition would be possible now and for all time to come. True science conserves but does not destroy.

I note the phrase, "Americanism shines forth." Again I ask the question, What kind of Americanism shines forth in these tall buildings, and in the laws and the ordinances which govern and control their erection? It is the very same Americanism which expresses itself in a great love for quick and immediate gain, the same Americanism which has already nearly despoiled a continent of its forests, its soil and its waterways. Fortunately, and herein lies our hope, we have awakened from that condition at last, and have begun in many fields the work of applying the remedy before it is too late.

I take note of how "the architect must rise to the demands and possibilities of the hour;" of "the transplanted architecture of Europe;" that America will come into the "heritage of time," and of "art—virile, true, fundamental as the life-processes of the nation." How, may we ask? And then the suggested answer, "by changing the drapery of dead forms of the old-world architecture"—changing the coat, as it were.

How little has all this to do with the problem. What matters it as yet how we cover these great steel frames, so long as we see behind the walls which they support, and behind the whole conception a condition of things that is as senseless as any that history records in the art of building? What is there in all this to inspire the imagination of the architect to create, to invent, when he realizes that his structure will, though rising hundreds of feet in the air, eventually become but a part of a great canon of the same height, behind the walls of which will be thousands and thousands of human beings in a semi-darkness, and of these, nearly half, spending their days behind windows opening upon a well hundreds of feet deep into which the sun never streams and where the phrase "light of day" would seem but a mockery? What power of imagination could make such conditions the inspiration for a work of art?

Art is the result of a slow evolution—the product of an infinite number of forces. A utilitarian idea has caused, has been the reason for, all the virile architecture of the past. This idea was simply and crudely expressed at first; later it developed into its fullness. The art and architecture of a people of a given time and place is a gauge, an exact expression of their complete idealism, not as concerns esthetics alone, but more particularly as representing an expression of their ambitions and desires in each and every field of human activity and endeavor. In our tall buildings, as they stand to-day, erected under our present laws and ordinances, draped as they are with the forms of the old world, we find as complete and perfect an expression of the idealism of the present generation as is expressed in any architecture of Europe or the world—past or present. In them we find an expression of our "Shadow Democracy" of the past. They indicate clearly the nature of our national, state and municipal governments. They express our individualism and the composite nature of our people. They show clearly the kind of idealism possessed by those who have rushed to our cities during the last quarter-century.

From our American cities, as they stand to-day, we could reconstruct, ten centuries hence, a story of our own time. The story is as clearly told as that of Greece in her temples; of Rome in the forum, or of the middle ages in the great cathedrals.

But of to-morrow! What can we say? And even of to-day! Do these buildings express to us the true idealism of our time? Do they express the trend of our new democracy? Are they, and the laws and ordinances governing their erection, an expression of the idealism which you and I hold concerning the economic development of our cities? Do they express that idealism which you and I hold concerning better social conditions, the proper housing of workers, more ample provision for light and air, and protection against fire? They do not, and I therefore predict that in the years to come these great buildings will not be built in the manner in which they are built to-day. It will not be long before we shall take steps to guard with greater care the rights of the individual. We will not allow one individual to take from another his right to our

only common natural resources in a city—light and air. Strive as he may, under the present conditions, the architect cannot rise to the occasion for the simple reason that as yet the occasion does not exist.

We have certain laws and certain ordinances which, in themselves, are just as much a part of the program of a building as the wishes of the owner. False economic conditions, themselves the result of our laws, and the fact that in most of our building operations the initiative comes from a promoter rather than the ultimate owner, have naturally made the laws the limiting conditions of our program. The promoter must fill his buildings and show a good rent roll if he is to sell.

A man possessed three adjoining lots, and upon the center one he erected a tall building just as deep as the law allowed. He put windows in the four walls. He then erected two more buildings adjoining and shut out some of his own light. Next he purchased property round the block opposite his former holding and thereon did the same, shutting out nearly all of the light from his former operations. Finally he erected a very tall building across the street from the first.

It is quite unnecesasry to draw any conclusions concerning such methods, but we can compare him to ourselves, the common owners of the city in which we live.

Mr. Ray has opened the subject. It is pertinent for us to discuss, not what will be the future of the skyscraper, but rather what that future could be if developed along rational and economic lines.

How Land Valuations in New York Have Been Affected by Tall Buildings.

By Lawson Purdy,

President Board of Tax Commissioners, New York.

Little has been done by direct action in the United States to regulate buildings. Indirectly, the heights of buildings have to some degree been regulated by laws governing character of construction and protection against fire. Thus in the city of New York a tenement house may not be more than six stories high without being fireproof, and if of that height it must have certain fireproof features.

I am told that in Chicago a tenement house may not be over three stories high without being fireproof, which accounts for the pleasing appearance of many of the streets lined with attractive three-story tenement houses.

We have allowed men to use their land as seemed good to them, regardless of the effect of that use on the property of their neighbors and on the general welfare of the community. Before the invention of the elevator and the steel frame, buildings were rarely too high, but in the last

thirty years we have seen a dreadful destruction of value because of the failure to protect property owners from the injury they suffer by the erection of unsuitable buildings by neighbors.

This fact has been brought home to me by the duties of my official position. I am frequently required to pass on applications for the reduction of the assessed valuation of real estate. During the last six years I probably have passed on 50,000 such applications, and have thus become familiar with the great variety of reasons for such requests.

One of the common reasons for the request to reduce an assessment is the shutting off of proper light and air by the erection of adjacent buildings.

There are considerable sections in the borough of Manhattan in which large numbers of buildings are no longer reasonably profitable because of lack of light and air. Many loft-buildings are to-day unprofitable, which, when first erected, were highly profitable. A common type of loft-buildings is ten stories high, ninety feet deep, fronts on a street sixty feet wide, and is built to within ten feet of the rear of the lot.

When such a building was first erected, and no neighboring buildings were of equal height, the tenants had ample light and air; but when buildings were erected on either side, within twenty feet of the rear and within sixty feet on the other side of the street, light and air were inadequate, and the tenants left for newer buildings, where, for the time being, the light and air were superior.

There are many office-buildings in the borough of Manhattan returning a miserable percentage on the investment, because to-day two-thirds of the offices require artificial light at all times. It looks to the casual observer as if there must be many office-buildings within the loop in Chicago which suffer from the same trouble.

A few owners of land have reaped great fortunes because of the lack of regulation, but the majority of property owners have suffered by it. We have fearfully congested land valuation where land is most valuable in the city of New York. There are corner lots 25 x 100 feet worth about $1,250,000, and yet within 1,000 feet there are lots of the same size worth not more than $25,000.

If we had imposed suitable limitations, not upon height alone—for towers may be beautiful—but upon height as compared with area, there probably might be no lot worth $1,250,000. But there would be no lot in that neighborhood worth so little as $25,000. The people would have been spread out over the down-town zone, and so would the valuation. The streets are so congested in that part of the city that it is difficult to walk along them. The transportation facilities are crowded. Mr. Bassett told me the other day that to carry all the tenants of the new Woolworth Building, if they all started for home at the same time, express trains on the subway, running as fast as they can be made to run, would take twenty minutes to carry away the population of that one building.

The same state of affairs exists in the housing of the people as exists in their office-buildings and lofts. We have permitted people to be crowded together in an atrocious manner that is detrimental to health and comfort,

and we have produced extravagant land values. Those land values have been concentrated in a comparatively small area.

It is too late to do what ought to have been done for the crowded part of the city in the borough of Manhattan, but it is not too late to save part, at least, of the outlying boroughs of the city from a like fate. I hope we may have the assistance of the more enlightened real-estate owners, who should aid us, if merely for their own self-interest.

It is obvious that if we permit six-story tenement houses, covering seventy per cent of the lots, to be created in Queens, it will take a great many million people to create a demand for 129 square miles of territory. A few men will reap fortunes. The majority of the owners of real estate in the borough of Queens will wait a great many years before they will get enough to pay their taxes.

I have no specific regulation to propose, but let us say the regulations are such that half as many people can be crowded together on the same spot, and that would be too many; still a demand will exist for twice the land area, which certainly will be an advantage to more of the owners of real estate than to permit Manhattan conditions in that territory.

Allowable Heights and Areas for Factory Buildings.*

By Ira H. Woolson (Member N. F. P. A.)

In the design of factory buildings, one of the vital features tending to control the spread of fire is a judicious limitation of height and area. It is self-evident that whatever restricts a fire reduces the life hazard. Owing to the supreme importance of these two subjects, a person contemplating the erection of a building of this class should give careful consideration to the history of fires in such buildings, and the experience gained in fighting them. The question is more acute in this class of buildings than in any other because of the fire hazard which exists in them, and the economic advantages due to reduced costs in construction and supervision, when several large areas are housed under a single roof. Just where to draw the line so as to produce reasonable safety without prejudice to building investments is the problem.

* Paper read before the American Society of Mechanical Engineers.

Factory buildings of excessive heights or areas have long been recognized by underwriting organizations as a grave danger to life and property, owing to the difficulty of controlling fires in them. They have for years urged limitations which have been freely ignored by ambitious architects and factory owners, because the suggested restrictions were considered unreasonably drastic. The evidence produced in this paper strongly supports the limitations which were advocated.

It is logical to assume that the men best fitted to determine safe limits of heights and areas are the men who have made a life work of combatting fires under all conditions of weather and hazard. With this idea in mind, the writer communicated with all the fire marshals and fire chiefs in the United States representing cities of over 20,000 population. A set of eight questions and a letter of explanation were sent to each. Fire chiefs as a class are not good technical correspondents, therefore it was not surprising that only one third of the men addressed responded to the appeal. However, replies were received from 117 representative cities well distributed as to size and geographical location. These have been summarized and form the basis of this paper. A few of the replies indicated a misunderstanding of the questions, and these were discarded. The questions were as follows:—

1. What should be the greatest height allowed for manufacturing or warehouse buildings *without sprinkler equipment?*

Brick and joist construction.....Height in ft.....or No. of Stories....
Fireproof construction.....Height in ft.....or No. of Stories....

2. Take the same question as No. 1, but assume the buildings to be fully equipped *with automatic sprinklers.* What height would you approve?

Brick and joist construction.....Height in ft....or No. of Stories....
Fireproof construction.....Height in ft....or No. of Stories....

3. What should be the greatest floor area allowed in the same class of buildings *without sprinkler equipment?*

Brick and joist construction.....Area in sq. ft....or Width....ft. Length....ft.
Fireproof construction.....Area in sq. ft....or Width....ft. Length....ft.

4. If the same buildings were fully equipped *with automatic sprinklers* what area would you approve?

Brick and joist construction.....Area in sq. ft.....or Width....ft. Length....ft.
Fireproof construction.....Area in sq. ft.....or Width....ft. Length....ft.

Each building was assumed as a good one of its class, with enclosed stairways and elevator shafts; and the chiefs were requested to base their answers upon experience in fighting fires in the class of buildings described, and to assume restrictions which would afford a reasonable chance of controlling a fire on any floor.

Naturally, and quite properly, the replies reflect the local conditions, such as the efficiency of the fire department, the water pressure, the combustibility of the goods being manufactured, the number of sprinkler equipments in service, and the degree of congestion among the buildings. However, all conditions were represented, and the summary of so large a number of opinions should indicate fairly well the average condition throughout the country. (See Table 1.)

TABLE 1. GENERAL AVERAGE OF 99 TO 111 REPLIES RECEIVED FROM ALL CLASSES OF CITIES[1]

Type of Building	Stories in Height	Area between Fire Walls in Sq. Ft.
Non-Fireproof, not Sprinklered	3.1	6,300
Fireproof, not Sprinklered	4.9	12,300
Non-Fireproof, Sprinklered	4.6	12,800
Fireproof, Sprinklered	7.0	27,100

Average story height was 12 to 13 ft.

The answers regarding allowable heights were much more uniform than those relative to area. It is significant that 83 per cent of the replies would limit the height of a fireproof sprinklered factory building to less than ten stories. The opinions in reference to height of the other classes of buildings were exceedingly uniform, and consistently low.

Replies as to permissible areas in sprinklered buildings were widely divergent, but for the unsprinklered classes they were more uniform than would naturally be expected considering the great diversity of conditions under which they were prepared.

It is evident from the figures given, that the fire chiefs have no settled policy among themselves as to the credit that should be given to an automatic sprinkler equipment as a fire extinguishing device. A few enthusiasts would permit unlimited area in a sprinklered building, while on the other hand a considerable number would give very little or no increase, when sprinklers are installed. Two chiefs stated that their unfortunate experiences with sprinklers had caused them to lose faith in their reliability. As a whole, however, they are strongly in favor of sprinklers and are inclined to permit over generous areas in buildings so equipped.

In order that the replies may be intelligently interpreted they have been separated into three groups, Tables 2, 3, 4, according to size of the city represented, and each group has been analyzed to show the character of the answers given to each question.

In the cases referred to by an asterisk where no limits to areas were given, they were not included in the averages, but were counted in the columns giving the number of answers above the average. In each group it will be noted that about the same number of men gave high answers to all questions, the proportion being one quarter to one half of the number in the group. The uniformity of height limits, and the lack of it in the area limits, is very apparent in all groups. It will be noted that the largest area values are given in Groups I and II, comprising the smaller cities. This is significant, and needs explanation.

Occasionally the fire chief of a small city has experience which would abundantly qualify him to estimate properly the merits of fireproof construction and sprinkler equipments; more often, however, his city has meager protection of this kind, and consequently he has little opportunity to judge of their efficiency, and it is not strange that he should be a bit extravagant in the credit he would give them.

[1] The variation in the number of replies (averaged) resulted from some incomplete answers.

TABLE 2. GROUP I. SUMMARY OF ANSWERS FROM 52 CITIES WITH A POPULATION OF 20,000 TO 50,000.

Type of Building.	Stories in Height.			Answers above Average.	Area in Square Feet.			Answers above Average.
	Average.	Max.	Min.		Average.	Max.	Min.	
Non-Fireproof, not Sprinklered	2.8	6	1	13	6,000	20,000	1,150	15
Fireproof, not Sprinklered	4.4	10	2	24	12,600	60,000	1,150	15
Non-Fireproof, Sprinklered	4.1	8	2	17	12,300	*60,000	3,000	17
Fireproof, Sprinklered	6.3	12	3	18	27,300	*180,000	5,000	20

*Four votes received in favor of "no limit to area" in this class.

TABLE 3. GROUP II. SUMMARY OF ANSWERS FROM 23 CITIES WITH A POPULATION OF 50,000 TO 100,000.

Type of Building.	Stories in Height.			Answers above Average.	Area in Square Feet.			Answers above Average.
	Average.	Max.	Min.		Average.	Max.	Min.	
Non-Fireproof, not Sprinklered	3.2	6	1	8	8,300	40,000	2,500	5
Fireproof, not Sprinklered	5.2	10	1	6	14,800	60,000	2,400	4
Non-Fireproof, Sprinklered	4.8	10	3	5	16,300	75,000	1,500	5
Fireproof, Sprinklered	7.7	20	4	5	36,300	200,000	4,000	5

TABLE 4. GROUP III. SUMMARY OF ANSWERS FROM 36 CITIES WITH A POPULATION OF 100,000 AND OVER.

Type of Building	Stories in Height.			Answers above Average.	Area in Square Feet.			Answers above Average.
	Average.	Max.	Min.		Average.	Max.	Min.	
Non-Fireproof, not Sprinklered	3.5	7	1	17	5,400	10,000	900	15
Fireproof, not Sprinklered	5.3	9	2	18	9,800	22,500	2,400	10
Non-Fireproof, Sprinklered	5.0	10	3	15	11,300	22,500	900	13
Fireproof, Sprinklered	7.5	12	4	16	19,400	*80,000	2,500	9

*Two votes received in favor of "no limit to area" in this class.

The most rigid restrictions on area are found in Group III, embracing the large cities. As fireproof construction and sprinkler equipments are common in most of our large cities, it is reasonable to assume that the fire chiefs of such cities would have had much more experience with such methods of protection, and be better able to decide what increase should be given in the size of a building when such protection is provided, than their less experienced fellow officers in smaller towns. It is thought quite proper to assume that their figures are more nearly correct and should be given the most weight.

Significant evidence in support of this argument is found in the fact that four chiefs who give no limit to areas in non-fireproof and fireproof sprinklered buildings are located in cities having a population of less than 50,000 in which there are few fireproof factory buildings or sprinkler equipments. On the other hand only two chiefs, in cities over 100,000 population, suggest a "no limit area" in a fireproof sprinklered building, and none approves such areas for non-fireproof buildings.

With these thoughts in view, Table 1 has been changed somewhat to be more in accord with the weight of evidence. It is believed, therefore, that Table 5 represents more correctly the consensus of opinion among the fire chiefs of the country best qualified to judge as to what should be the proper limits of height and area for factory buildings.

TABLE 5. ALLOWABLE HEIGHTS AND AREAS IN FACTORY BUILDINGS

Type of Building	Stories in Height	Area between Fire Walls in Sq. Ft.
Brick and Joist Construction, not Sprinklered.	3	6,000
Fireproof Construction, not Sprinklered.....	5	10,000
Brick and Joist Construction, Sprinklered....	5	13,000
Fireproof Construction, Sprinklered.....	8	20,000

These values might be increased somewhat under the influence of especially favorable local conditions, as previously explained, but the writer submits that as they represent the average deliberate judgment of such a large body of men, so well qualified to estimate the hazard which the values involve, they should be given careful consideration, and should be increased only with the utmost caution.

Courtesy of *Fire Protection*.

Exploded can of "Burnishine" liquid stove polish causing fire in Iowa home.

Fire Hazard in Stove Polish.

The Association has recently received from members in various localities advices as to the increasing use of liquid stove polish containing a large percentage of benzine. This hazard has been frequently encountered in years past, but generally in remote sections. Its presence in Rochester, N. Y., was recently discovered by the Fire Prevention Committee of the Rochester Chamber of Commerce. The brand in question, as reported by Mr. Ralph Barstow, Assistant Secretary of the Chamber, is "Blackene," manufactured by the J. L. Prescott Company of New York City. It is retailed at ten cents per can and appears to be about ninety per cent benzine. It is called "Modern Benzine Liquid Stove Polish," and there is a warning on the can in black ink:—

"DO NOT USE WITHIN FIFTEEN FEET OF FIRE OR HOT STOVE AS IT CONTAINS BENZINE."

The hazard is further emphasized by the line printed in red ink over black type on another part of the can,

"BENZINE—UNSAFE WHEN EXPOSED TO HEAT OR FIRE."

In Davenport, Iowa, a similar stove polish, reported by *Fire Protection* as "Burnishine," was recently the cause of fire in a residence, causing a loss of $400. In this case two cans of the liquid were placed on a shelf over the kitchen stove, notwithstanding the fact that the cans were labeled as above indicated and as shown in the accompanying illustration. The heat from the stove exploded the cans upon the kitchen shelf. The contents of one were thrown into a basket of clean clothes, igniting the same; while the other, operating as a blow torch, burned a hole through the wall and communicated fire through open joist construction to the attic. When the fire department arrived, flames were bursting through the roof.

It is obvious from the care taken by the manufacturers of this product to point out its hazardous properties that no attempt is being made by them to conceal the fact of its danger. The responsibility for its use would therefore seem logically to rest with the purchaser. Unfortunately, however, experience has demonstrated that householders, and more frequently domestic servants who sometimes are not familiar with the English language, must be protected from their own carelessness and ignorance. Cleaning and polishing mixtures of various kinds are frequently vehicles of fire and death, and it would seem to be a reasonable provision that the sale of all such hazardous products for use by inexperienced persons should be prohibited. Where used commercially their hazard is commonly recognized and proper precautions taken.

We have conferred with our active member, The National Wholesale Grocers' Association, respecting the sale of hazardous brands of stove polish, and have the assurances from the secretary of that organization that our protest has been referred to the Fire Prevention Committee of that body and that the Association will use its influence with a view to preventing, if possible, the storage or distribution of products tending to cause avoidable fires. Meanwhile, as the general use of this hazardous liquid stove polish is certain not only to cause fires but serious personal injury, principally to women, members of the Association throughout North America are urged to use their personal influence with their grocers to induce them to exclude such products from their stocks and to co-operate in protecting householders against the dangers involved in their use.

The Automatic Sprinkler as a Life Saver.

The consideration of the automatic sprinkler as a life-saver is rapidly extending into all ranks of men who are interested in the protection of life. One of the most helpful addresses calculated to give this device its proper place as a life-saving agent was delivered at the semi-annual meeting of our associate member the National Association of Cotton Manufacturers at Atlantic City by one of our Boston members, Mr. L. H. Kunhardt. Mr. Kunhardt criticised the disposition of the daily press to include in a sweeping condemnation all factory managements as indifferent to the safety of their employees. He said:—

It would not be going too far to say that the protection of factories has to-day reached a higher standard of excellence and perfection, due to the co-operation of manufacturers, than has the protection of any other class of property in the United States. This is an absolute fact.

It is perhaps with an apology that I should present some of the facts to this Association, because they are already well known to you.

It was the cotton manufacturers of New England who first laid the foundation of fire protection engineering in 1835, nearly eighty years ago.

The development of slow-burning mill construction was due to these men, and its success in reducing the fire losses was first demonstrated by them. Fire doors, fire walls, segregation of processes and isolation of the more dangerous ones from the main buildings, fire escapes, enclosure or removal of belts and substitution of electric transmission, removal of stoves and kerosene lamps, protection of gears, installation of self-closing elevator hatches and many other devices, brick stair towers, and last, but not least, automatic sprinklers—have all been the contribution of the cotton manufacturer to the development of the science of fire protection.

It would be as idle to assume that all these things were done for the safety of employees as it would be to assume that they were all done for the benefit of the manufacturer. Safety to employees goes hand in hand with safety and success to the business, and owners years ago came to recognize the fact that one cannot ge along without the other.

It is to be noted that recent fires, resulting in serious loss of life, have occurred in small factories and usually in those near the centres of cities where surroundings are more congested and the temptation has been to crowd too many persons into limited quarters not perhaps originally designed or intended to accommodate them. The larger factories and those more isolated from other exposures, as is usually the case in the industrial establishments of to-day which have done so much to promote the success and reputation of this country, have given most serious consideration to the matter of self protection with the result that they have been almost entirely free from loss of life when fires occur.

As emphasizing this, I may state that the records of the Boston Manufacturers' Mutual Fire Insurance Company show that, since the beginning of Factory

Mutual System in 1835, there have been but thirty-five lives lost in our factory fires, twenty-three of these being in an unsprinklered mill in Fall River in 1874 before the automatic sprinkler was developed and available for protection. Of the remaining twelve deaths (all occurred since 1874), three were killed by going back needlessly into the burning building, evidently to save personal effects at a cotton mill fire in 1907, and four were men of public fire departments killed in the performance of their duties at different mills. This leaves only five employees who were not able to save themselves in a period of thirty-nine years to date, and even including all, only a total of thirty-five deaths have occurred in seventy-eight years.

In factories covered by this record, all of which have fire protection and are of good construction, there are now employed 1,500,000 people, and there are in the homes dependent upon these at least 3,000,000 more, so that it may be said that there are now in these factories, or dependent upon them, 4,500,000 persons who are assured of almost absolute security of their own lives from fire, or the lives of those upon whom they are dependent,—this due to the safeguards provided by the owners.

Add to the above the fact that department stores, mercantile buildings, warehouses and similar structures in cities are improving their present construction in many cases and installing sprinklers and other fire apparatus, and that new buildings are being constantly erected in which the owners with full appreciation of the hazard of fires are insisting on the best construction and protection, and it will certainly be evident to the unprejudiced observer that tremendous strides are being made in preventing loss of life by fire. In these classes there is estimated to be at least an additional 250,000 persons working under sprinkler protection.

In modern protected department stores, moreover, let me call attention to the fact that, while the employees are safeguarded by the good construction and protection, there are daily many thousands of customers in these stores whose lives are made secure also.

In conclusion let me emphasize that the most vital factor in preventing loss of life and property is the automatic sprinkler and that this alone will render the great majority of fires harmless to life and of small damage to property, but there must, however, be secondary safeguards briefly covered by the general name "slow-burning construction," which means brick or equivalent walls, solid floors without openings between stories, stairs in outside towers, elevator and other openings protected, and safe arrangement of processes. Then, even if very rarely, sprinklers fail for any cause, the spread of fire will be so retarded that the operatives can escape without harm. New legislation designed to prevent such awful catastrophes as that at Binghamton should therefore be shaped broadly in line with the safeguards developed by over seventy-five years of practical work in the large manufacturing properties of this country.

The Protection of Main Belt Drives with Fire Retardant Partitions.*

With Observations on the Safeguarding of Vertical Openings Through Floors and the Relation of such Protection to the Safety of Operatives Employed in Manufacturing Establishments.

By C. H. Smith (Member N. F. P. A.)

The importance of safeguarding stairways by placing them in towers well cut off from the remainder of the building and of protecting the openings made by elevators through the floors has long been recognized. To-day, more than formerly, these features are taken care of in the design of manufacturing buildings, including also well arranged towers for the main belts or ropes where this method of driving is employed. Fig. 1 shows how these features may be taken care of in a textile mill.

The following remarks apply more particularly to the older manufacturing buildings and to those of more recent construction where the best principles of design of stair and elevator towers and belt and ropeways have not been followed. Neglect to safeguard vertical openings through floors has resulted in serious loss of life among occupants of the building, who found themselves cut off from their accustomed exits by the rapid spread of fire up through such unprotected openings.

In mills insured with the Mutual companies stairs and elevators have generally been well arranged, and the fire protective devices such as automatic sprinkler systems, etc., have shown their value not only in reducing the loss of property by fire to a minimum, but also it has been demonstrated that approved construction, high standards of general order and neatness and efficient fire protection works as well to safeguard the lives of operatives employed.

At the present time there are approximately 1,500,000 people employed in the 2,800 industrial works insured with the Mutual companies, located in 29 states of the Union and Canada. Since the inception of the system in 1835, there have been but 32 deaths caused directly by fires in these properties and 21 were in a fire in an unsprinklered mill in 1876 before sprinklers

* Paper read before The American Society of Mechanical Engineers.

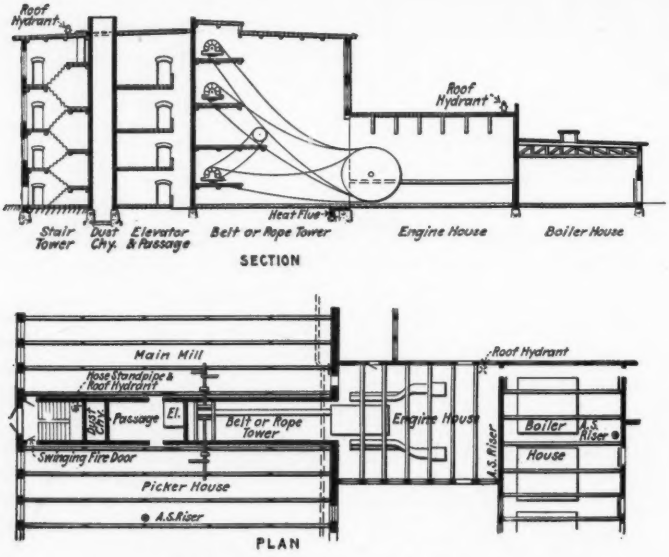


Fig. 1. Belt, Stairway and Elevator Towers.

were in general use. This would indicate that under present conditions the loss of life would average less than 1 per year per 1,000,000.

Of the total of 32 lives lost, poorly constructed beltways which allowed the rapid spread of smoke and flame were to a large extent responsible for the deaths of 25 persons. The need of safeguarding the vertical openings through floors around the main driving belts had been less fully appreciated. Conditions at these drives were aggravated, moreover, because it was the general custom to enclose the belts with boxes of wood, which in some cases were about head high and in others extended to the ceiling. The boxes tended to become oil soaked and to accumulate lint. A fire once starting at or near them would rapidly make headway, being carried by the natural draft up through the mill. Such a fire would also be more or less sheltered from the action of the sprinklers in the room.

The recurrence of several large property losses from this source led to consideration of this matter, and measures were taken which have to a great extent eliminated the open beltway hazard from Mutual risks. In the experience of these companies there have been about 20 fires occurring in the vicinity of main drives in which the open beltway was an important factor in the spread of the fire. These 20 fires resulted in a total loss of $2,721,635, an average of $136,082 per fire. Some of the larger of these losses occurred in the days before sprinkler protection was as complete as now, but the statistics showed that even with complete protection the open beltway was a serious hazard.

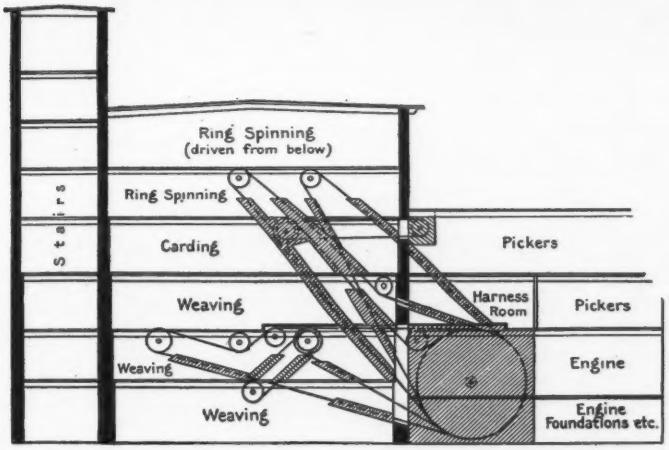


Fig. 2. Section showing Belts and Wooden Boxing before Fire of September 15, 1907.

The last bad fire from this source occurred September 15, 1907, at a cotton manufacturing establishment in Fall River. This is a stone mill, 339 ft. long, 74 ft. wide and five stories and basement in height with a four-story wing, 94 ft. long and 65 ft. wide, projecting from the rear at the center of the mill. The engine room was located in the first story of this wing. The belts were boxed with wood and most of these were cut off head high in the several stories. Fig. 2 shows the general arrangement of the drive.

Sunday forenoon a bearing in the beltway just above the flywheel was being repaired. While the man doing the work stated that he had no knowledge of anything that could cause the fire, it is probable that its origin was connected with his work. After completing the job he left the locality. On returning ten minutes later, he saw fire just below where he had been at work, and gave the alarm.

The fire passed up through the wooden belt boxing into all stories as far as the fourth floor where the drive terminated. The mill filled with heat and smoke so rapidly that in five minutes no one could enter the rooms. This was in spite of 650 sprinklers which opened, but in justice to the sprinkler equipment it should be stated that the water pressure at this mill was weak. A section about fifty feet wide was badly burned on each side of the main drive up through the mill.

After this fire plans were worked out to enclose the main drives with partitions of a fire retardant character, so as to approximate the standard belt tower with brick walls, such as are found in many mills of modern design.

The limitations of cost, available space, etc., which prevail in many places where the belt tower is not a part of the original design, make neces-

sary special construction such as was adopted in this case, and has been succesfully used in many others of the older mills.

The plan provided for inclosing the main drives with partitions of expanded metal and cement construction from two inches to two and one-half inches thick depending on the story heights. A framework is constructed of expanded metal wired to one inch or one and one quarter inch channel iron studs spaced twelve inches apart, and secured to the floor and

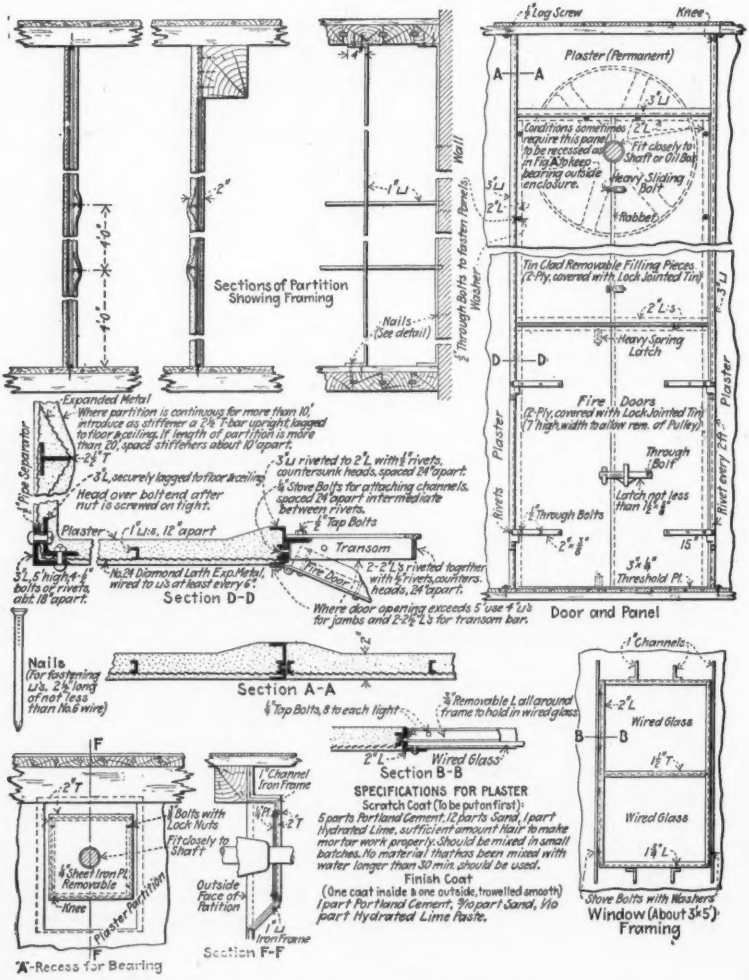

Sections of Partition Showing Framing
Wall
Nails (See detail)
Through Bolts to fasten Panels
Washer
Plaster (Permanent)
Conditions sometimes require this panel to be recessed as in Fig. A to keep bearing outside enclosure.
Fit closely to Shaft or Oil Bolt
Heavy Sliding Bolt
Rabbet
Tin Clad Removable Filling Pieces (2-Ply, covered with Lock Jointed Tin)
Heavy Spring Latch
Fire Doors (2-Ply, covered with Lock Jointed Tin) (1" high, width to allow rem. of Pulley)
Through Bolt
Latch not less than
Through Bolts
Rivet every 24"
Plaster
Rivets
Threshold Pl.
Door and Panel
Expanded Metal
Where partition is continuous for more than 10', introduce as stiffener a 2½" T-bar upright, lagged to floor & ceilings. If length of partition is more than 20', space stiffeners about 10' apart.
Pipe Separator
Head over bolt end after nut is screwed on tight.
Plaster
No.24 Diamond Lath Exp. Metal wired to 3's at least every 6".
Section D-D
Stove Bolts for attaching channels, spaced 24" apart intermediate between rivets.
Tap Bolts
Transom
Fire Door
Where door opening exceeds 5' use 4" L's for jambs and 2-2½" L's for transom bar.
Nails (For fastening L's. 2½" long of not less than No.6 wire)
Section A-A
Tap Bolts, 8 to each light
Removable Lath around frame to hold in wired glass
Wired Glass
Section B-B
Channels
Wired Glass
Stove Bolts with Washers
Window (About 3'x5') Framing
SPECIFICATIONS FOR PLASTER
Scratch Coat (To be put on first):
5 parts Portland Cement, 12 parts Sand, 1 part Hydrated Lime, sufficient amount Hair to make mortar work properly. Should be mixed in small batches. No material that has been mixed with water longer than 30 min. should be used.
Finish Coat
(One coat inside & one outside, trowelled smooth)
1 part Portland Cement, 3/10 part Sand, 1/10 part Hydrated Lime Paste.
Bolts with Lock Nuts
Fit closely to Shaft
Sheet Iron Pl. Removable
Knee
Plaster Partition
Outside Face of Partition
Channel Iron Frame
Iron Frame
Section F-F
A-Recess for Bearing

Fig. 3. Details of Construction for Fire Retardant Belt Enclosures.

ceiling. Longitudinal stiffeners of the same material as the studs are used. Where necessary, as in the case of a continuous partition of more than ten feet, additional stiffness is secured by providing two and one-half inch tee-bar uprights. On the frame so constructed Portland cement mortar is applied by plastering to make a solid partition, all of the iron frame being embedded in the cement with the exception of the door jambs. These partitions, being comparatively light in weight, could be set up anywhere on the heavy mill floors without the necessity of strengthening them, although where possible it was arranged to have the partitions come over the beams. Although this form of construction for partitions has been largely used and with satisfaction, it would be possible of course to employ some of the special forms of studding now on the market which combine the studs and lathing in one sheet of metal. Details of the construction used are shown in Fig. 3.

While in general the enclosures occupy only the floor space necessary for the main belts, it was endeavored to have them as roomy as conditions

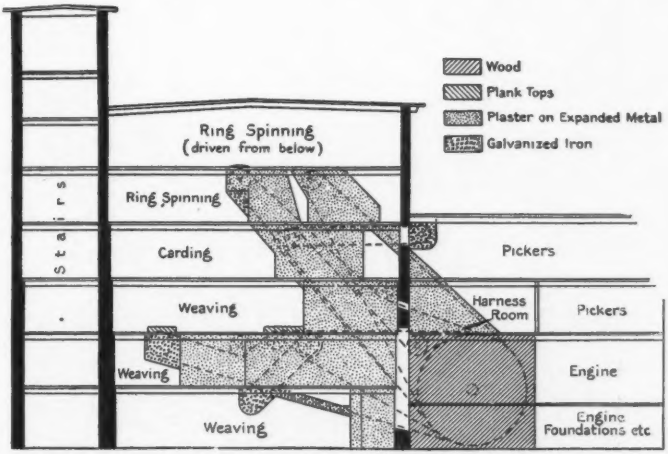


Fig. 4 Section showing Main Drive as now Protected by Fire Retardant Enclosures

of machinery installation would permit, in order to facilitate inspection and repairs to the main belts. Provision was made for taking down the lineshafting without disturbing the body of the partitions, usually by placing the fire doors which gave access to the enclosure under the lineshaft, and providing removable wood tin-clad panels constructed like fire doors above the latter. The main bearings were generally left outside the enclosures and to accomplish this the panels in front of the pulleys were sometimes recessed.

It was also the endeavor to arrange these enclosures so that they would be as well lighted as possible by including in them windows in the side

wall of the building or providing wired glass windows in metal frames to admit light to the beltway from the room. Fig. 4 shows diagrammatically the completed work at the Fall River mill, and Figs. 5, 6, 7 and 8 are photographs of belt enclosures in different stories. The adaptability of the construction is evidenced in the sloping sides and offsets which it was necessary to make in many cases on account of crowded conditions in the vicinity of the main belts.

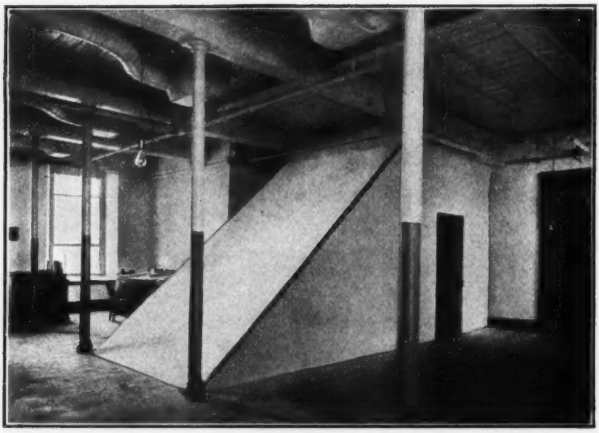


Fig. 5. Harness Room, Second Story, Directly over Flywheel, showing Protection of Belts leaving Wheel.

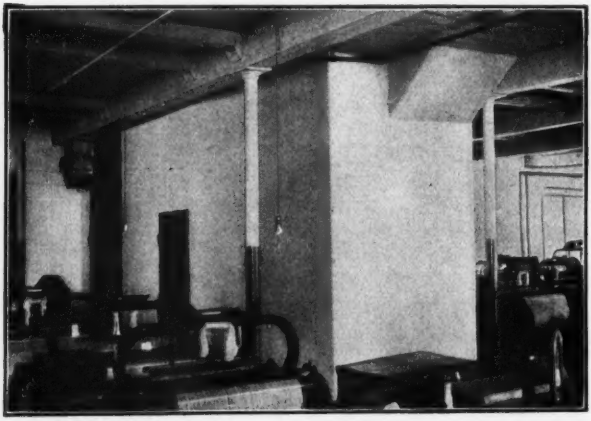


Fig. 6. Weave Room, Second Story. Note Fire Door with Removable Panels above to allow Access to Pulley on Lineshaft.

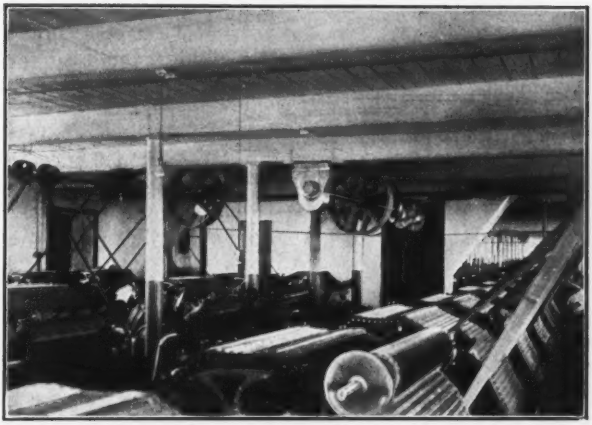


Fig. 7. Card Room, Third Story. Ends Sloped to Economize Space. Note Wire Glass Window and Fire Door with Removable Panels above.

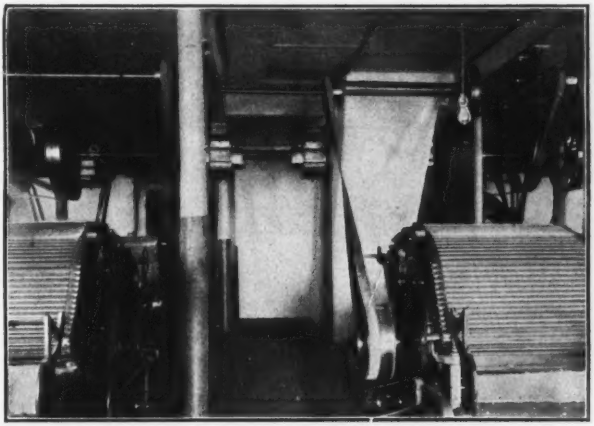


Fig. 8. Card Room, Third Story. End View of Belt Enclosure. Bearings All Outside.

While there is no claim that these partitions are as efficient in withstanding the action of a severe fire as a brick wall would be, they are undoubtedly effective in preventing the dangerous draft up through an open beltway. In an actual fire in one of the mills where this construction was installed these enclosures were successful in confining the fire to narrow limits, and undoubtedly prevented a very serious loss.

Stairways. Where interior stairways are not properly enclosed in brick towers, it is possible to improve the conditions with enclosures of the

same type of construction as employed in the beltway work, although it would be much better where the appropriation can be secured to build a standard tower of brick or concrete, especially if the mill is of any considerable height. Placing the stairs and elevators in towers projecting from the mill wall frequently results in a gain of valuable floor space.

The type of stair tower that has been developed in the factory buildings at Philadelphia is deserving of more general adoption as it combines with its functions of a stair tower that of a fire escape in the best sense. It consists essentially in a tower separated from the mill so that access to it can be had from the several floors of the mill only from an outside platform or from a vestibule which is open to the air. Such a tower can never become filled with smoke from a fire in the mill. Many of the older mills in other sections of the country have stair towers that can be readily converted into towers of the Philadelphia type by closing the openings between the stair tower and the mill in the several stories and arranging for an outside platform in each story communicating from the mill to the tower.

Elevator Enclosures. We have also found the use of expanded metal and cement partitions practicable for enclosing elevator wells that were not properly protected in the original construction of the building, or where they have since been added. The necessary openings at such elevator shafts should be closed, preferably with wood tin-clad doors of the type which serve as safety gates as well. Where space does not permit of the installation of such doors, rolling steel shutters arranged to be automatically operative by the melting of a fusible link, as well as manually, can be used providing the hazards of occupancy are not excessive.

Other Uses. The average cost of partitions of the construction advocated is from thirty cents to thirty-three cents per square foot. These figures are for the work in place and include a contractor's profit. These partitions have been used with superior results and not greatly increased expense over ordinary forms of combustible construction for the purpose of separating special hazards from the remainder of a manufacturing room. For such purposes as the construction of bins to contain inflammable stock, the segregation of waste working machines, construction of lacquer rooms, etc., uses are constantly being found for this material in manufacturing works.

Department of Fire Record.

Department Stores—Fire Record.

The department store fire record is of interest not only because of the increase in numbers of such properties with their large values, but also because of the opportunity to compare recent experience with the results given in the fire record published in the QUARTERLY Volume 1, Number 2. The record now given is made up entirely of fires that have occurred since the publication of the old record, that is, since October, 1907. Charts comparing the causes, location of fires and the agency by which they were discovered have been prepared to assist the reader in the analysis of this data. Each chart is accompanied by a brief explanation of the principal points to be noted.

A study of the causes of department store fires does not reveal any marked difference from that of many other classifications. The percentage of special hazard causes is lower than that usually found in manufacturing plants, while over a third of the fires are reported as starting from an unknown cause. The amount of combustible material is so large that fires starting at night in unsprinklered stores usually make such headway by the time the firemen arrive that it is impossible to determine the cause.

The particularly noticeable item under common hazards is the large number of fires due to lighting, twenty and one half per cent of all known causes. This high percentage is undoubtedly in part accounted for by the presence of so much combustible material as to make it nearly certain a fire will start if a defect develops in the lighting system, while in many other properties such a defect would have been discovered before a fire resulted. Smoking is charged with having caused nine and one half per cent, and rubbish and sweepings eleven percent of all fires,—both preventable causes.

The special hazards are largely those due to the waste chute and waste vault, which represent fourteen and one half per cent of all known causes. Fortunately this hazard is so well recognized that modern department stores are so constructed that these waste chute or waste vault fires usually result

in only a trifling loss. Restaurants or candy kitchens in such stores naturally introduce their particular hazard, as evidenced by the three per cent of fires traceable to cooking ranges. Electric or gas irons are held responsible for two and one half per cent of the fires.

It is of interest to note that fifty-five and seven-tenths per cent of these fires occur at night and fifty-nine and four-tenths per cent while the store is closed.

The sprinkler record of this classification is very good, in that eighty-three and two-tenths per cent of the fires were practically extinguished by the sprinklers, while only two and five-tenths per cent were unsatisfactory. No claim was made in fifty-one and two-tenths per cent of the fires, and the large loss fires only amounted to six per cent,—quite a satisfactory showing when the nature of the contents is considered. Five heads or less operated in ninety-two per cent of these, while one head was sufficient in fifty-nine per cent of the fires in this class of property. The average number of heads that opened is 2.64, a decided improvement over the old record with an average of 5.0 heads.

A slight change has been made in the method of determining some of the percentages in the sprinkler tables, in order to simplify the comparison of different systems. This change will be evident by referring to table number eleven on the efficiency of water supplies to sprinkler systems. In former tables the percentage for fires extinguished by waterworks as a primary supply would have been based on the relation between the number of fires extinguished by sprinklers having waterworks as a primary supply to the total number of sprinkler fires, that is, twenty-four compared to 119, or twenty and one-tenth per cent; while in these tables it is based on the relation of the fires extinguished by sprinklers having waterworks as a primary supply to the total number of fires where waterworks was the primary sprinkler supply, that is, twenty-four to twenty-eight, or eighty-five and seven-tenths per cent. By determining the percentages in this manner, it makes possible the comparison of various systems of primary supply and brings out such interesting points as the gravity tank having the lowest percentage of its fires extinguished or practically extinguished by the sprinklers, namely, sixty-six and seven-tenths per cent, while it shows the largest percentage of unsatisfactory fires, namely, eleven and one-tenth per cent. This is undoubtedly due to the low pressures found in this classification in the gravity tank equipment where the pressure only averaged thirty-one pounds per square inch, in contrast to the average of eighty-nine pounds pressure for all sprinklered stores. It is of further interest to note that the unsatisfactory gravity tank fire had only ten pounds pressure. The percentages for all sprinkler fires are determined in a similar manner and noted under the heading of total. The same basis of calculating the percentages is used in all the tables, and permits of such interesting facts as the distinctly superior showing of equipments having over fifty pounds pressure being clearly pointed out in table number twelve.

In studying all such data as is given in these tables the reader should take into consideration the number of fires entering into the calculations,

for in some instances the number is too small to warrant drawing conclusions from the percentages derived therefrom, such percentages being determined primarily to make the totals balance. This point is well brought out in the case of primary supplies having automatic pumps. Obviously the remarkable showing of the automatic pump with one hundred per cent of its fires extinguished or held in check is a coincidence in the five fires where it was the primary supply, and does not indicate that such a system is more desirable than the other forms of primary supply.

The study of the department store fire record indicates very clearly the need of greater care being exercised in order that the future may not continue to show such a large part of the fires caused by rubbish, defective lighting systems, smoking, etc. The automatic sprinkler is shown to be of great value in protecting such properties with their highly inflammable contents and large values, while as a safeguard to life from fire and panic in crowded department stores, the automatic sprinkler is of inestimable value. In view of the opinion of the most eminent fire protection engineers of the country, that the automatic sprinkler is probably the best means of safeguarding life from fire, one cannot understand how any department store owner can continue to allow the possibility of a terrible holocaust to exist in his crowded store by neglecting to install automatic sprinklers.

Department Stores—Fire Record

Total Number of Fires, 307.

1. CLASSIFICATION OF CAUSES.

Summary

Common Causes.

	No. of Fires.	Per Cent of Common Causes.	Per Cent of Known Causes.
Lighting	41	29.5	20.5
Heating	17	12.2	8.5
Power	7	5.0	3.5
Boilers and Fuel	9	6.5	4.5
Chimneys and Flues	1	0.7	0.5
Fourth of July	3	2.2	1.5
Lightning	4	2.9	2.0
Smoking	19	13.7	9.5
Matches	4	2.9	2.0
Rubbish and Sweepings	22	15.8	11.0
Spontaneous Ignition	4	2.9	2.0
Miscellaneous	8	5.7	4.0
Total	139	100.0	

Special Hazard Causes.

	No. of Fires.	Per Cent of Special Hazards.	Per Cent of Known Causes.
Waste Chute and Waste Vault	29	66.0	14.5
Electric or Gas Irons	5	11.3	2.5
Christmas Decorations	1	2.3	0.5
Kitchen Stoves	8	18.1	4.0
Rags for Finishing Furniture	1	2.3	0.5
Total	44	100.0	

	No. of Fires.	Per Cent of Known Causes.
Common Causes	139	69.5
Special Hazard Causes	44	22.0
Incendiary	3	1.5
Exposure	14	7.0
Total Known Causes	200	100.0
Unknown Causes	107	
Total	307	

Chart I.

This chart is intended to show the comparative weights of the many different causes of department store fires. Each cause appears with the same form of shading in each record, and in so far as possible they are placed side by side in the two records. Causes which do not appear in both records, as July 4th, Lightning, etc., are not shaded.

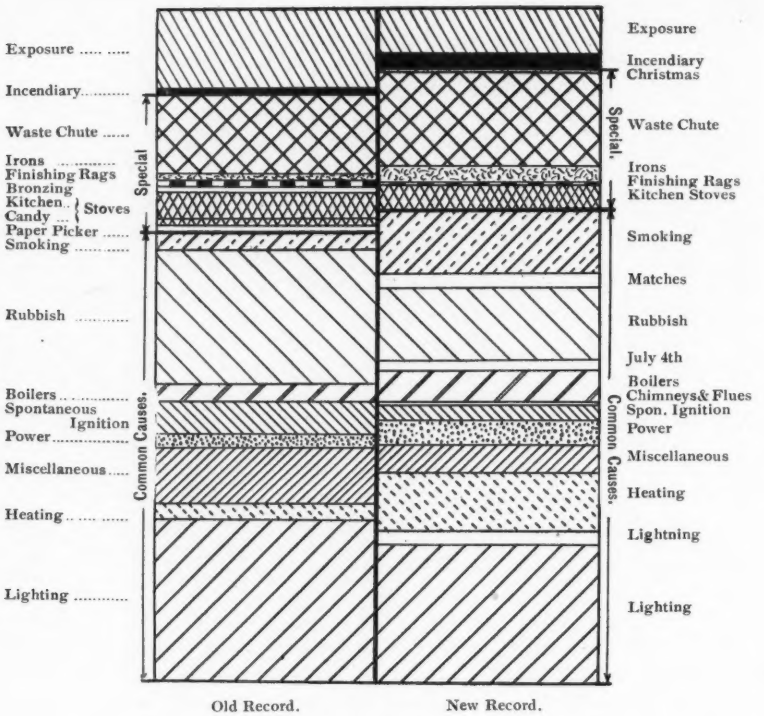
The first noticeable point is the large percentage of common causes, which is 69.5 per cent of all known causes in the new record. The special causes form practically the same percentage in both records and are largely made up of those due to the waste chute.

Examining the causes item by item brings out many interesting facts. The considerable reduction in the exposure area of the new record is encouraging and may possibly be attributed to better building combined with an increased efficiency on the part of fire departments. Fires caused by incendiaries are shown by the solid black area, and represent a very small proportion of the total causes. The apparent increase in the number of such fires may be due to a real increase of incendiarism, or to the fact that fires are being more carefully investigated, and those which formerly would have been classed as unknown are discovered to be the work of an incendiary.

The large percentage of waste chute fires in department stores is clearly shown. Although there is a slight increase in the percentage of such fires, a thorough appreciation of this hazard by underwriters has resulted in reducing the losses to a small amount in most of such fires. The increased use of the gas or electric pressing iron is reflected in this chart by the larger area in the new record. This hazard is one that should be guarded against, for even though it represents only two and one half per cent of the known causes, it has resulted in many disastrous fires. The modern department store has so many special forms of activity that hazards ordinarily belonging to altogether different industries may often be found; such, for example, are those due to finishing rags, kitchen stoves, etc. The very small blank area at the beginning of the special causes is the result of Christmas decorations.

The first item under common causes is smoking, and it is rather discouraging to observe the decided increase in fires caused by smoking and also matches. Probably the best explanation of this marked difference is the increased popularity of the cigarette, especially those made in the last year or two which seem to have a paper that will smoulder for a long time. Following down to the next item, rubbish, one finds a real improvement in fires attributed to this cause. However, the area in the new record is still large enough to emphasize what a serious factor rubbish is in department stores. Another encouraging sign is the decrease in the space representing fires caused by spontaneous ignition, which kindles anew the feeling that the hard work of educating the people respecting these preventable causes, as rubbish, spontaneous ignition, etc., is beginning to bear fruit.

CHART I.



Causes of Department Store Fires.

The modern department store has more and more use for mechanical energy, and so it is not entirely surprising to find the three closely associated causes, boilers, power and heating, gradually increasing in percentage. The last item, lighting, is the largest single cause of fires in department stores. The gradual improvement of lighting, with the larger use of well installed electric systems, is slowly making for better conditions, as is evidenced by the appreciably smaller area representing lighting in the new record.

In conclusion, it is suggested that the reader make note of the large space taken up by those causes which are almost wholly due to negligence, as smoking, rubbish, etc., and make a resolve to do his part toward removing such causes from fire records.

DETAILS OF CAUSES.

Under this heading are given brief descriptions of fires caused by unusual conditions, or which are of an educational value in emphasizing different hazards. Fires caused by ordinary conditions or well understood hazards may not be included.

S-7617. Ladies' cloak and suit department was lighted by arc electric lights, and owing to a defective globe some sparks dropped on the carpet and suitings, igniting them.

H-2416. Window was trimmed for a "Santa Claus" display. A "make and break" spark apparatus was worked by Santa Claus pressing a button with his foot. Spark ignited cotton, decorations, etc., and when Santa Claus opened door to get out, a draft was created which helped the flames to spread into body of store. Loss $104,000.

H-3550. Fire was the result of an overheated stove and occurred at seven in the evening, about one hour after the store was closed for the day. It is probable that the fire in the stove got low during late afternoon and that additional fuel was put on, and as it did not warm up, the people in the store thought the fire had gone out and they left the store without giving it further attention. Later on, the fire got under headway and the excessive heat set fire to goods on shelves nearby.

H-3332. Small gas stove used for heating pressing irons was left burning in rear window of building.

H-6093. Electric Light Company was experimenting with a new equipment and caused the fire by overloading the wires.

H-6360. Fire was caused by owner striking match in vicinity of leaking acetylene gas machine.

H-4222. Fire caused by dropping a cigar or match into box containing packing material, which was located on sidewalk next to building under frame awning. Loss $3,438.37.

H-3527. A showcase was lighted with small tubular, incandescent lamps. Floorwalker noted one of lamps was not burning, and thinking it was not sufficiently screwed into socket, attempted to screw it in further, thereby breaking the glass bulb, which caused a spark from the filament to ignite celluloid combs.

H-3382. Fire was caused by bursting of electric light globe, allowing carbon filament to fall into a tray of celluloid combs which were directly under the light.

H-8938. A portable incandescent electric light was placed in stock rack of wall paper, and after thirty to forty-five minutes ignited the paper.

Lamp guards are advisable on all portable lights.

H-2624. Fire started in defective electric wiring on temporary arch placed in show window by window trimmer, immediately upon closing the switch controlling the window lighting.

An incompetent electrician is a hazardous employee.

H-8742. Fire was caused by an electric flatiron left standing on an ironing board with current turned on. This iron was not provided with proper stand, pilot light or automatic device of any kind. The iron was connected to a ceiling receptacle which was on the same circuit as two office lights. When the store closed that evening the manager, wishing to work in this office, did not open the switch. When he left the store he turned off the office lights at the sockets, thus leaving the ceiling receptacle with current on.

S-14237. Fire was caused by slipping of belt on motor pulley driving elevator pump. This belt had been running out of line and it is said that a board had been set up to hold belt on the pulley. It is possible that friction against this board ignited the belt.

S-14131. Fire was caused by employee who left incandescent electric light in stock of cotton flannel and linen. Fire promptly discovered (when sprinkler head opened) by watchman, constantly on floor. Still alarm was sent to city department when A. D. T. board man telephoned Insurance Patrol that valve alarm had operated but that engineer at store refused to state cause of trouble.

S-14130. In millinery department an electric iron is used for pressing hats. The iron was originally installed with a pilot lamp, but this had been removed. Night janitor switched on lights when he came to this floor to do the cleaning, and thus turned current on the iron which was on a wooden box. The iron burned through the box and set fire to some near-by curtains. Prompt discovery prevented any loss.

S-14012. Fire was caused by the blowing of the fuse in the line supplying power for an electric freight elevator. The cover to fuse box was blown open and the flash ignited a pile of rolled wall burlap and carpets some three to four feet distant.

S-13963. Fire was caused by poorly installed smokepipe from hot water heater located in first floor. The smokepipe passed through ceiling and was poorly protected, being within one inch of joist; no proper space was left around pipe nor collar provided, and complete installation was poor.

S-7983. Short circuit of electric lamp cord used as a line wire to switch for showcase lights.

S-7780. Grease on inside of exhaust pipe above gas cooking range became ignited.

S-7757. Watchman apparently hit his head against two gas jets hanging from ceiling by one-fourth inch pipe, causing them to break off and allowing the gas to escape, which was ignited by his lantern.

S-7576. Electric flatiron on same circuit as window light with pilot lamp not visible from switchboard. Individual flatiron switch left closed during day with window light circuit open. Window lights turned on at night, causing fire.

S-6869. Wooden box temporarily stored on top of metal breeching from battery of high pressure boilers, ignited from radiation of heat through a protection of two inches of asbestos on top of breeching.

S-9047. Caused by ignition of floor boards and loose lumber piled about flue pipe from bake ovens in bakery on eighth floor. Pipe poorly protected by asbestos.

S-11873. Nernst lamp filament dropped into bottom of globe. Globe broke, allowing filament to fall onto cotton in window.

S-11646. Man repairing deck lights in sidewalk dropped hot sulphur onto pine shelves.

S-10692. Electrician soldering joint on stepladder; ladder collapsed, precipitating employee and alcohol torch into stock of open cotton batting.

2. MISCELLANEOUS STATISTICS.

Analysis of Losses.

Fires Where Sprinklers Operated.

	Common Causes.		Special Causes.		Unknown Incendiary Exposure.		Total No. of Fires.	
	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.
No Claim	32	60.4	23	65.7	6	19.3	61	51.2
Small Loss	20	57.7	12	34.3	19	61.4	51	42.8
Large Loss	1	1.9	..	..	6	19.3	7	6.0
Total	53		35		31		119	

Relation Between Effect of Sprinklers and Losses.

	Extinguished.		Held in Check.		Unsatisfactory	
	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.
No Claim	53	53.6	8	47.1	..	..
Small Loss	43	43.4	8	47.1	..	..
Large Loss	3	3.0	1	5.8	3	100
Total	99		17		3	

All Department Store Fires.

	Common Causes.		Special Causes.		Unknown Incendiary Exposure.		Total.	
	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.
No Claim	40	29.8	25	56.8	6	5.1	71	24.0
Small Loss	58	43.3	15	34.1	38	32.5	111	37.7
Large Loss	36	26.9	4	9.1	73	62.4	113	38.3
Total	134		44		117		295	

Fires Where Sprinklers Were Not Affected.

	Common Causes. No. of Fires.	Special Causes. No. of Fires.	Unknown Incendiary Exposure. No. of Fires.	Total.
No Claim	5	1	2	8
Small Loss	21	1	9	31
Large Loss	..	..	..	..
Total	26	2	11	39

Protection Other Than Automatic Sprinklers.

In twenty-one fires chemical extinguishers were also used in extinguishing fires, in three instances water pails, and in eleven cases small hose.

Protection Where Sprinklers Were Not Used.

Of the fires put out without the use of sprinklers, water pails were used in ten instances, chemical extinguishers in eleven, hose in one, while in two the fire was stamped out, and in one smothered with a blanket.

Amount of Water Used by Automatic Sprinklers.

In thirty-nine fires the amount of water used by the sprinklers was reported, the average being approximately 750 gallons.

3,335 gallons	1 fire.
2,600 "	1 "
2,500 "	1 "
2,000 "	1 "
1,700 "	1 "
1,500 "	2 fires.
1,000 "	1 fire.
900 "	1 "
800 "	2 fires.
700 "	4 "
600 "	2 "
500 "	5 "
400 "	3 "
300 "	4 "
200 "	6 "
150 "	3 "
100 "	1 fire

3. ROOM IN WHICH FIRE OCCURRED.

	Common Causes.		Special Causes.		Unknown Incendiary Exposure.		Total.	
	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.
Basements . . .	20	17.6	..	..	23	24.2	43	17.0
Attic	1	0.9	1	2.3	2	2.1	4	1.6
Roof	3	2.6	..	..	..	..	3	1.2
Awning, Yard, etc.	6	5.2	..	..	5	5.4	11	4.3
Outside from Exposure	..	..	..	..	14	14.8	14	5.5
Stable	1	0.9	..	..	1	1.0	2	0.8
Boiler Room . .	12	10.5	..	..	1	1.0	13	5.2
Waste Chute . .	1	0.9	24	54.6	..	..	25	9.9
Storage or Stock Room	11	9.7	4	9.1	18	18.9	33	13.0
Waste and Rubbish Storage . . .	9	7.9	3	6.8	1	1.0	13	5.2
Show Window . .	9	7.9	1	2.3	..	..	10	3.9
Packing and Shipping Room . .	6	5.2	..	..	3	3.2	9	3.5
Millinery Department	..	..	3	6.8	1	1.0	4	1.6
Kitchen or Restaurant	3	2.6	6	13.5	1	1.0	10	3.9
Dry Goods . . .	5	4.5	1	2.3	3	3.2	9	3.5
Furniture . . .	3	2.6	..	..	2	2.1	5	2.0
General Salesroom .	16	14.0	1	2.3	11	11.7	28	11.4
Elevator Shaft and Pit	1	0.9	..	..	3	3.2	4	1.6
Coat Room, Closets and Lockers . .	3	2.6	..	..	1	1.0	4	1.6
Office	1	0.9	..	..	1	1.0	2	0.8
Miscellaneous . .	3	2.6	..	..	4	4.2	7	2.8
Total with data given,	114		44		95		253	
No data	25		..		29		54	
Total . . .	139		44		124		307	

CHART II.

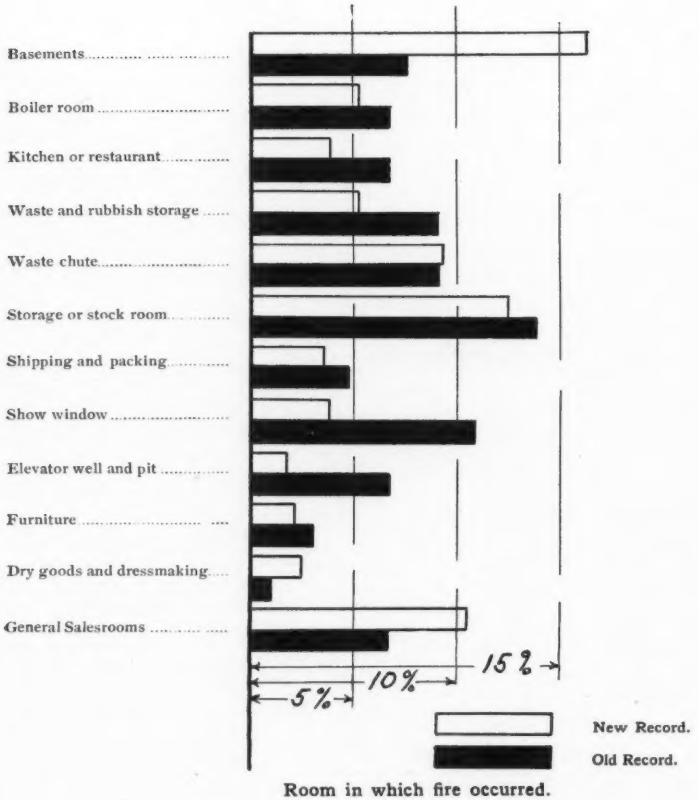

Basements
Boiler room
Kitchen or restaurant
Waste and rubbish storage
Waste chute
Storage or stock room
Shipping and packing
Show window
Elevator well and pit
Furniture
Dry goods and dressmaking
General Salesrooms
5%
10%
15%
New Record.
Old Record.
Room in which fire occurred.

Chart II.

This chart permits the reader to readily note the rooms in which department store fires usually occur. A comparison of this data with respect to the two records is also given.

The first item shows the rather surprising fact that seventeen per cent of the fires occurred in the basement, and that this percentage is about double that given in the old record. There does not seem to be any ready explanation of this, unless modern stores are utilizing basements to a greater extent. The number of fires located in the boiler room has slightly decreased and is not any greater than might be expected from present conditions. The decrease in the number of fires in kitchens, or restaurants, indicates that their special hazards are being recognized and more carefully guarded against. Equally encouraging is the decidely better showing as regards fires occurring in waste and rubbish storage. Since most of such fires are due to negligence, any decrease is an indication of real improvement. The number of fires located in the waste chute, and also those in storage or stock rooms, is very nearly the same in both records. Slight decreases in the percentages for furniture departments, shipping and packing rooms are worthy of note. Possibly the one item of greatest interest is the reduction of show window fires, from eleven per cent to three and nine-tenths per cent in the new record, thus indicating improved lighting of show windows and removal of many of the old hazards found in them. An equally noticeable reduction is that relative to elevator wells and pits. The increased use of gas and electric irons, and similar hazards of the dry goods department, is reflected in the more than double percentage charged to that location. A large increase in the fires which occur in the general salesroom is another change, for which no explanation is apparent. A final glance at this chart indicates the following locations as being the most frequent starting places of department store fires: Basements, storage or stock rooms, general salesroom.

4. DAY OR NIGHT FIRES. (Day Fires 6 a. m. to 6 p. m.)

	Common Causes.		Special Causes.		Unknown Incendiary Exposure.		Total.	
	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.
Day	71	51.1	25	56.8	40	32.3	136	44.3
Night	68	48.9	19	43.2	84	67.7	171	55.7
Totals . . .	139		44		124		307	

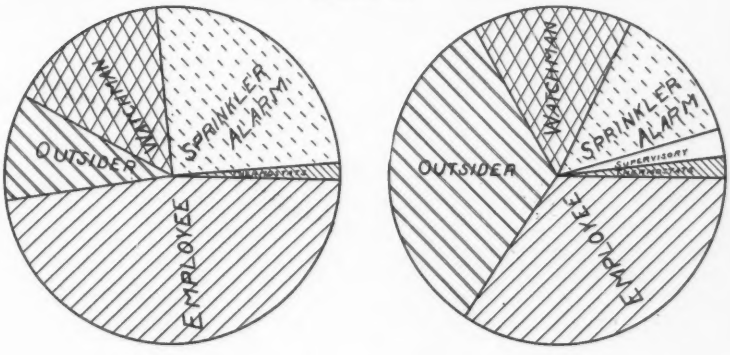
5. PLANT IN OPERATION.

	Common Causes.		Special Hazards.		Unknown Incendiary Exposure.		Total.	
	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.
Plant in operation .	66	48.5	21	47.7	36	29.3	123	40.6
Plant not in operation	70	51.5	23	52.3	87	70.7	180	59.4
Total with data given,	136		44		123		303	
No data	3		..		1		4	
Total . . .	139		44		124		307	

6. HOW DISCOVERED.

	Common Causes.		Special Hazards.		Unknown Incendiary Exposure.		Total.	
	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.
Employee . . .	50	38.4	18	42.8	30	25.9	98	34.0
Watchman . . .	20	15.4	6	14.2	17	14.6	43	15.2
Outsider	34	26.2	4	9.6	57	49.2	95	32.8
Sprinkler Alarm .	20	15.4	10	23.8	8	6.9	38	13.1
Thermostat . . .	4	3.1	..	..	2	1.7	6	2.1
Supervisory . . .	2	1.5	4	9.6	2	1.7	8	2.8
Total with data given,	130		42		116		288	
No data given . .	9		2		8		19	
Total . . .	139		44		124		307	

CHART III.



Old Record. New Record.

Agency discovering fire.

Chart III.

Before considering this chart it is well to explain that the old record contains a larger percentage of fires in buildings equipped with automatic sprinklers than the new record. The early facilities of the Association for gathering fire records were not as complete as at present and consequently a fewer number of reports for unsprinklered properties were obtained. It is probable that this fact accounts for the somewhat larger number of fires discovered by sprinkler alarms in the old record.

The watchman seems to have remained about the same and is credited with having discovered fifteen and four-tenths per cent of the department store fires. The remarkable increase in the number of such fires discovered by outsiders is difficult to understand. This increase is largely balanced by the drop in the number of fires discovered by employees. Possibly the one most interesting fact is the relative showing of these two agencies (outsider and employee) compared to those agencies especially maintained for discovering fire; the first two representing approximately two-thirds of the total. The small number of fires that were discovered by thermostats or supervisory systems is clearly indicated and shows that there is not a sufficient number of such installations in use at present to have any appreciable influence on fire losses.

SPRINKLER FIRE RECORD.

7. EFFECT OF SPRINKLERS.

	No. of Fires.	Per Cent of Whole.
Extinguished or practically extinguished fire	99	83.2
Held fire in check	17	14.3
Unsatisfactory	3	2.5
Total	119	
No Claim	61	51.2
Small Loss	51	42.8
Large Loss	7	6.0
Total	119	

8. UNSATISFACTORY SPRINKLER FIRES.

S-7553. This fire, of unknown origin, broke out shortly after 11 P. M., in the fur cold storage room. The damage was entirely confined to this room by the seventy-eight sprinklers which operated. The fire had apparently smouldered for two or three hours before being discovered, as the sprinklers did not operate promptly because of the circulation of cold air produced by a blower or fan. When it is considered that within this area of 4,000 square feet there were stored furs valued at $760,000, it is not surprising that this small fire caused a loss of approximately a half-million dollars.

The advisability of dividing such large values into several parts is emphasized.

(*For details of above fire see July, 1908, Quarterly.*)

S-9759. Building was four and five stories in height, with hollow ceilings or low blind attics. These attics, which extended over the entire fifth floor and the greater part of the fourth floor, were from two to five feet in height, forming the roof of buildings and ceilings of floors below with a lath and plaster finish. The building was protected by a wet sprinkler system in all parts except these blind attics, which were on a dry system. The fire started from an unknown cause in the blind attic and had made much headway before discovery. The roof over the five-story portion was destroyed and badly damaged over the four-story part. The damage to contents was very large because of the nature of stock and large amount of water that flooded the building. Although no direct evidence was available to prove such a conclusion, it seemed very probable that water on the dry system must have been shut off to have permitted the fire to make such a start. Loss $130,000.

(*For details of above fire see July, 1910, Quarterly.*)

9. POINTS OF INTEREST FROM FIRE REPORTS.

Construction.

H–3303. This building had at one time been used as an Opera Hall and when converted into storerooms another and lower ceiling was built. The fire worked its way between these two ceilings and the firemen were unable to get at it, so that very little could be done toward checking the fire until the upper portion of the building was destroyed.

H–6336. The freight elevator opening was a direct means of allowing the fire to spread quickly throughout the building.

H–8899. The rapid spread of the fire was due, unquestionably, to the easy access it had between the floors through the open elevator shaft and stairways. Goods and walls on the upper floors were burned and scorched in both directions from the openings for a distance of some twenty-five to thirty-five feet. The elevator car was stationed at the first floor at the time of the fire and the flames did not enter the basement at any point.

H–4393. The walls of this building were thrown outward by the expansion of the iron beams and crashed through the roof of the two-story brick building adjoining, causing the latter to be completely destroyed.

H–2368. The two buildings were separated from each other by a blank brick wall sixteen inches thick on the first floor and twelve inches above, with a twelvé-inch parapet extending two and one-half feet above roof. Fire did not communicate to the north building until the roof collapsed, which pulled over a portion of the twelve-inch fire wall, allowing the fire to spread to the north building.

It appears that the roof joists were tied through the wall to the joists on either side by one and one-fourth iron bands and the joists on either side extended four inches into the wall on the third floor.

S–13591. Fire was found in the hollow joist ceiling of basement and first floor, and evidently spread from one floor to the other through a hollow space between the door jamb of the frame vestibule. This hollow space has two small vertical openings about two by four inches, each running the full length between floors without stops at lower end and with only wire lath and plaster over same at top. The inside of these openings was badly burned and apparently was the only way the fire traveled from one floor to the other.

Protection.

S–12528. Upon discovery of fire employees of store immediately attacked it with chemical extinguishers. Fire was extinguished through the use of three extinguishers and three pails of water before it ignited the wooden window sash or cracked the glass.

S–14490. Smoke was discovered coming from bottom of iron dumb-waiter shaft. Fire was extinguished with pails of water before heat reached sprinkler head in top of shaft.

S–14455. Fire started in rubbish chute from unknown cause. Fire within chute was extinguished, but spread to space between inside iron door and exterior wooden door where it burned until extinguished by chemicals in hands of employee.

S–14443. Fire occurred in a showcase due to breaking of an electric light bulb, which set fire to stock of celluloid combs. The fire spread almost immediately to all the combs in the showcase as well as to those in the adjoining case, and it is said the flames reached nearly to the seventeen-foot ceiling. A pail of sand was thrown on fire at once, but this did not seem to be effective, so six fire pails were used, which put the fire out.

H–3724. Fire was probably caused by defective wiring in fan and motor house located in frame house on roof. It was practically extinguished by the use of ten two and one-half gallon extinguishers before the arrival of public department.

H–4462. Fire started from unknown cause between joists in hollow ceiling of ninth floor over hallway. Ceiling was finished with plaster and metal wire lath. Owner tore up floor and used two and one-half-inch hose with one and one-eighth inch nozzle from standpipe. Water was only used for a moment and then the extinguishment was completed by an eighty-gallon chemical.

Property was equipped, in this portion, with sprinklers and thermostats. Heat was so confined in joist channels of hollow ceiling that it was not sufficient to operate either sprinklers or thermostats.

Automatic Sprinklers.

S–8783. Fire started from unknown cause in waste paper vault. Automatic tin-clad doors into vault, also metal-clad doors at each floor, are said to have been closed when fire occurred; therefore there was no smoke nor fire outside of vault and chute, and general results from sprinklers and thermostats were entirely satisfactory.

S–8566. Stock was piled so closely it was impossible for the sprinklers to extinguish the fire.

S–14654. The sprinkler directly over spot where fire originated fused, but did not operate. After the fire this sprinkler was found with the upper lever resting against a metal guard that had been placed over the sprinkler as a protection against mechanical injury. This guard evidently had been hit at one time and moved out of place, thus interfering with the operation of the sprinkler.

Miscellaneous.

S-7714. Supervisory data. Water flow signal.....4.35 P. M.
Low water N. tank.....4.42 "
" " S. " .....4.42½ "
Gate valve closed.....4.44 "
" " opened.....5.35 "
Final O. K.....5.50 "

H-4372. Fire, when discovered, was small and could have been put out if any private means had been at hand. Loss $6,000.

Every building should be provided with some form of private protection.

H-4273. Owing to dense smoke, firemen were unable to fight fire until glass in skylight was smashed, thereby allowing smoke to escape.

H-6041. Employee lighted gas jet and dropped flaming match into excelsior in which furniture had been packed.

Inflammable material should not be allowed in the immediate vicinity of gas jets.

H-7328. Firemen were unable to locate the fire and turned a large amount of water into basement, flooding it, as fire was thought to have started from furnace, while the fire was gradually spreading in the second story where it started from defective wiring.

H-3082. There was considerable rubbish in the basement and in the rear of this and adjoining buildings there were piled up about twenty cords of wood, which helped the fire gain headway. Loss about $200,000.

10. NUMBER OF SPRINKLERS OPENED.

No. of Sprinklers Operating.	Extinguished Fire. No. of Fires.	Extinguished Fire. Per Cent.	Held Fire in Check. No. of Fires.	Held Fire in Check. Per Cent.	Unsatisfactory. No. of Fires.	Unsatisfactory. Per Cent.	Total. No. of Fires.	Total. Per Cent.	No. of Sprinklers Operating.	No. of Fires.	Per Cent of Whole.
1	64	65	6	35	..	..	70	58	1	70	59
2	18	18	6	35	..	..	24	20	2 or less	94	79
3	7	7	3	18	..	..	10	8	3 or less	104	87
4	3	3	1	6	..	..	4	3	4 or less	108	91
5	2	2	..	..	..	..	2	2	5 or less	110	92
6 to 9 inc.	3	3	..	..	1	33	4	3	Less than 10	114	96
10 to 24 inc.	1	1	1	6	1	33	3	3	Less than 25	117	98+
25 to 49 inc.	..	..	..	..	..	..	..	..	Less than 50	117	98+
50 and over	1	1	..	..	1	33	2	2	50 and over	2	2—
Total...	99		17		3		119				

Average number of sprinklers opened, not including unsatisfactory, 2.64.

11. EFFICIENCY OF WATER SUPPLIES TO SPRINKLER SYSTEMS.

Primary Water Supply.	Number of fires	Per cent. of fires	Average pressure	Average number sprinklers opened	Number and Per Cent of Fires. Extinguished fire (or practically extinguished)		Held fire in check		Unsatisfactory		Average Pounds Pressure. Extinguished fire (or practically extinguished)	Held fire in check	Unsatisfactory	Average Number Sprinklers Opened. Extinguished fire (or practically extinguished)	Held fire in check
Waterworks,	28	23.5	70	2.2	24	85.7	3	10.7	1	3.6	72	65	40	2.1	2.3
Gravity tank,	9	7.6	31	4.1	6	66.7	2	22.2	1	11.1	33	35	10	5.2	1.0
Pressure tank,	77	64.8	104	1.8	64	83.1	12	15.6	1	1.3	107	93	45	1.5	3.7
Automatic pump.	5	4.1	72	16.8	5	100.0	..	....	.	....	72	..	..	16.8	....
Total,	119	100.0	89	2.64	99	83.2	17	14.3	3	2.5	92	81	82	2.6	3.2

12. EFFICIENCY OF WATER PRESSURES ON SPRINKLER SYSTEMS.

Pressure on Sprinklers.	Number of fires	Per cent. of fires	Average pressure	Average number sprinklers opened	Number and Per Cent. of Fires. Extinguished fire (or practically extinguished)		Held fire in check		Unsatisfactory		Average Pounds Pressure. Extinguished fire (or practically extinguished)	Held fire in check	Unsatisfactory	Average Number Sprinklers Opened. Extinguished fire (or practically extinguished)	Held fire in check
Less than 15 lbs.,	2	1.7	11	3.0	1	50.0	..	....	1	50.0	12	..	10	3.0	....
15 to 24 inclusive,	4	3.4	21	6.5	3	75.0	1	25.0	.	....	21	20	..	8.3	1.0
25 to 49 inclusive,	9	7.5	39	12.7	6	66.7	1	11.1	2	22.2	39	30	42	14.5	2.0
50 and over,	104	87.4	97	1.9	89	85.6	15	14.4	.	....	99	89	..	1.6	3.4
Total,	119	100.0	89	2.64	99	83.2	17	14.3	3	2.5	92	81	32	2.6	3.2

13. EFFICIENCY OF WET OR DRY SPRINKLER SYSTEMS.

Wet or Dry System.	Number of fires	Per cent. of fires	Average pressure	Average number sprinklers opened	Number and Per Cent of Fires. Extinguished fire (or practically extinguished)		Held fire in check		Unsatisfactory		Average Pounds Pressure. Extinguished fire (or practically extinguished)	Held fire in check	Unsatisfactory	Average Number Sprinklers Opened. Extinguished fire (or practically extinguished)	Held fire in check
Wet system,	102	85.8	87	2.0	85	83.3	15	14.7	2	2.0	90	87	27	1.8	3.5
Dry System,	17	14.2	99	6.7	14	83.2	2	11.8	1	5.9	107	77	40	7.8	2.5
Total,	119	100.0	89	2.64	99	83.2	17	14.3	3	2.5	92	81	32	2.6	3.2

14. EFFICIENCY OF WATER SUPPLIES TO SPRINKLER SYSTEMS —As Regards Amount of Loss.

Primary Water Supply.	Number of fires	Per cent. of fires	Average pressure	Average number sprinklers opened	Per Cent. of Fires.			Average Pounds Pressure.			Average Number Sprinklers Opened.		
					No claim	Small loss	Large loss	No claim	Small loss	Large loss	No claim	Small loss	Large loss
Waterworks,	28	23.5	70	2.2	32.1	64.3	3.6	71	61	40	1.4	2.4	..
Gravity tank,	9	7.6	31	4.1	66.7	22.2	11.1	39	17	10	4.2	4.0	..
Pressure tank,	77	64.8	104	1.8	55.8	39.0	5.2	108	100	77	1.5	2.4	1.2
Automatic pump,	5	4.1	72	16.8	60.0	20 0	20.0	72	100	45	1.0	3.0	78.0
Total,	119	100.0	89	2.64	51.2	42.8	6.0	95	87	58	1.7	2.5	20.7

15. EFFICIENCY OF WATER PRESSURES ON SPRINKLER SYSTEMS —As Regards Amount of Loss.

Pressure on Sprinklers.	Number of fires	Per cent. of fires	Average pressure	Average number sprinklers opened	Per Cent. of Fires.			Average Pounds Pressure.			Average Number Sprinklers Opened.		
					No claim	Small loss	Large loss	No claim	Small loss	Large loss	No claim	Small loss	Large loss
Less than 15 lbs.,	2	1.7	11	3.0	..	50.0	50.0	..	12	10	..	3.0	..
15 to 24 inclusive,	4	3.4	21	6.5	50.0	50.0	..	20	21	..	10.0	3.0	..
25 to 49 inclusive,	9	7.5	39	12.7	33.3	33.3	33.4	40	34	43	1.0	2.7	78.0
50 and over,	104	87.4	97	1.9	53.7	43.2	3.1	100	95	89	1.4	2.4	2.7
Total,	119	100.0	89	2.64	51.2	42.8	6.0	95	87	58	1.7	2.5	20.7

16. EFFICIENCY OF WET OR DRY SPRINKLER SYSTEMS. —As Regards Amount of Loss.

Wet or Dry System.	Number of fires	Per cent. of fires	Average pressure	Average number sprinklers opened	Per Cent. of Fires.			Average Pounds Pressure.			Average Number Sprinklers Opened.		
					No claim	Small loss	Large loss	No claim	Small loss	Large loss	No claim	Small loss	Large loss
Wet system,	102	85.8	87	2.0	54.0	41.2	4.8	95	82	64	1.7	2.4	1.7
Dry system,	17	14.2	99	6.7	35.3	52.9	11.8	100	111	83	1.7	2.9	78.0
Total,	119	100.0	89	2.64	51.2	42.8	6.0	95	87	58	1.7	2.5	20.7

Note.—"Average number of sprinklers opened" does not in any case include the Unsatisfactory fires.

GENERAL FIRE RECORD.

Unsatisfactory or Serious Fires in Buildings Equipped with Sprinklers.

Where sprinklers fail the cause is, almost invariably, clear. These fires are selected to indicate such causes, that they may be generally understood and satisfactorily met.

S-15205. Fire started on the third floor of a five-story brick building used for tenant manufacturing. Buttons were manufactured on this floor, and the cause of the fire was probably due to a boy lighting a match in a dark room for the purpose of locating some special material. Buttons manufactured were covered with celluloid, of which it is said a considerable quantity was stored in the premises. The entire contents of the loft were destroyed. Sixty-eight sprinkler heads operated and held fire in check until the arrival of the fire department which extinguished the fire with hose streams. Five heads were fused on fourth floor, although no damage was done by fire to that loft. The fusing of these heads was probably due to the intense heat which worked up to the floor and traveled up outside the building.

The fire department did not reach scene of fire until fifteen minutes after discovery owing to delay in sending alarm, as the woman who discovered fire from across the street did not understand how to operate fire alarm box and was compelled to get the assistance of an employee on first floor of building in which fire occurred. By the time the fire department got into action, the sprinkler tanks were drained and the fire apparently gaining headway, consequently it was necessary to turn several hose streams into burning loft.

As far as could be learned there were about thirty-five hands employed in loft and it was **due to the operation of the sprinkler** heads that no lives were lost. Several of the employees were overcome but were revived by the flow of water from the sprinkler system. As it was, no one was injured, although it was reported that a girl employee jumped from rear window. The majority of the employees were taken to street in freight elevator.

Fire was prevented from extending to eastern section of building by the successful operation of the automatic fire doors. For some unknown reason no attempt was made by the fire department to couple up with siamese connections located on front of building and connecting directly with sprinkler equipment. Had this been done the water loss in all probability would not have been so great.

S-15020. This fire which took place in an idle hat factory was doubtless caused by sparks from a plumber's charcoal furnace which was on the roof and being used to keep tar hot in repairing the roof. The tar was first melted in an ordinary tar kettle in the yard and was then kept hot with a plumber's stove. The roof caught fire near dry room chimney of the main building and was discovered by several persons at practically the same time.

Town department experienced some delay in getting into action, so that the fire had gained considerable headway before the first streams were in use. Poor judgment was shown in putting six streams into service through long lines of 250 and 300-foot lengths of hose, especially as the first streams were weak. The gate valve of sprinkler system was found closed and the rubber gasket in the dry valve was reduced to ashes.

An effort was made to determine when, and by whom, the sprinkler valve was closed, but without success. Some state that they saw no water coming from the sprinklers, while others state sprinklers were discharging water when the first hose stream was carried inside the building. However, it is probable that the sprinklers, if they did operate, were so badly handicapped because of extremely low water pressure that they were unable to hold the flames in check.

S-14934. This fire was discovered on the second floor of a paper mill in section devoted to the storage of rags in bales. The mill and public alarms were given at once and hose streams quickly brought into use, being supplied by public water and mill fire pump. Fire was extinguished in less than an hour. It burned several bales of rags and charred the roof slightly over a small area.

About three-quarters of an hour after fire was discovered, a section of the floor, fifty feet in length, and three bays, or thirty feet in width, fell into the beater room, carrying its load of wet rags with it and doing some damage to the beaters, stuff chests, and other machinery. The floor was four-inch plank with one-inch hardwood top, supported on steel beams having a span of about fifty feet, beams being trussed with two rods each. Two of these trussed beams failed by the breaking of the trussed rods at one end where threaded. The cause of the failure was the additional load put upon the floor by the water used in extinguishing the fire, which stood on the floor to a depth of several inches and was absorbed by the rags, until some of the bales weighed double their original weight. One very wet bale, for example, which had an original dry weight of 663 pounds weighed 1620 pounds. The load on the floor from the ordinary storage of rags was approximately one hundred pounds per square foot. Computations made by the inspection department showed that the floor had a breaking strength of 203 pounds per square foot, so that the added water absorbed by the rags must have more than doubled the floor load.

It was noted during the fire that the sprinklers did not appear to be holding the fire in check. Examination after the fire showed no evidences of water over some of the sprinklers and very small rings over others,

whereas a few of the heads showed very large water rings over them, indicating that there was an ample supply of water at good pressure. The sprinkler piping around the fire was taken down and found seriously choked by stones and mud. The stones would frequently wedge at the sprinkler inlet, and in a number of cases in tees in the branch pipes. Thick mud would then fill in the crevices between the stones, making practically a tight obstruction. The effect of this choking of sprinklers and pipes prevented the sprinklers in the immediate vicinity of the fire from operating. The fire therefore burned unchecked by the sprinklers which ordinarily would undoubtedly have confined it to a small area. The heat escaping opened other sprinklers farther away which were not obstructed and which did tend to prevent further spread of fire.

The cause of the choking was primarily the small stones which probably got into the yard pipes, or perhaps even the adjacent town mains, when they were laid, due to lack of care in keeping out gravel. When the fire opened a number of sprinklers the flow of water carried the stones to the heads discharging water, where, wedging in the smaller fittings, they caused the obstruction described above. Although there was much mud found in some of the pipes it was soft, and without the obstruction caused by the stones would mostly have washed through the sprinklers without trouble.

Summary: **Defective sprinkler system.**

S-15042. About 6.30 p. m. a high degree automatic sprinkler head, located directly over annealing furnace in a metal stamping works, operated, no doubt from the excessive heat. Employee immediately shut off the valve controlling the sprinklers in this room, and upon his return the metal parts being heated in the furnace had become so hot that when these parts were drawn from the furnace and immersed in the oil bath the oil became ignited and fire immediately occurred. Had the employees immediately upon discovery of the fire opened the controlling valve, which was located in the section adjoining the fire, no doubt it would have been extinguished by the sprinklers; but instead of doing so they started laying a line from the hose house in the yard. All of the automatic sprinklers in this room fused and practically all the piping was down. There was also a considerable damage to the interior woodwork and patterns. Loss $7,000.

Summary: **Water shut off.**

S-14951. This fire occurred in an experimental paper mill devoted to the manufacture of artificial wood, fibreboard, pasteboard, etc. Buildings in which fire occurred were one-story and basement, frame, with open finish plank and timber floors, with several floor openings. The fire, which occurred about 10 a. m., practically destroyed the drying room, and was caused by a spark from sander igniting the dust from blower duct. Fire was discovered by the man operating the sander, who saw smoke coming from hole in floor. He used two chemical extinguishers and immediately gave the alarm.

Drying building was equipped with automatic sprinklers, 1–2–3 schedule, supplied by a 9,600-gallon gravity tank and a 750-gallon steam fire pump. Pressure on the sprinklers from the gravity tank was about twenty-one pounds. There was no public protection. The fire pump was located near south side of drying building near boiler house. At the time of fire the drying building contained about twenty barrels of resin in the basement, while there is said to have been at least forty more barrels of this material stored outside of drying building on west side on the slope toward the pump house.

Fire was evidently well under way in the fibreboard dust before discovery and had burned through the duct passing through four-foot hole in floor to first story, and was spreading rapidly, augmented by the blower. Although superintendent claims that fire pump was started immediately, evidence seems to indicate it was not, for the gravity tank was exhausted and allowed fire to make great headway before the pump was started. The burning resin was a considerable factor in the fire, feeding the flames in the building and threatening several other buildings, for the resin which had become melted and on fire ran down the slope toward the boiler and pump house, making it necessary for the engineer to leave the pump. Trenches were dug by the employees and this stream of melted resin was finally carried off into the river at one side.

The conclusions derived from this fire are that material like resin should not be stored in the main building in any quantity, but placed in a detached building preferably located on a lower level from that of surrounding plant.

S-14941. This fire occurred in building which had concrete walls and concrete floors, occupied by a sheet pyralin manufacturer. Fire originated just outside west end of the building in pyralin scrap which was in large wooden boxes covered by a heavy tarpaulin. Two men who were working in the second floor of the west section, which was even with the ground at this point, saw flames leaping through the door leading into the room from the street just outside. They had barely time to jump out the rear windows onto the roof of the one-story part, and thence to the ground.

The exact cause of the fire could not, and probably will not, be determined. The day was very warm and the rays of sun beat down all day on the tarpaulin-covered scrap. However, this has never been known at this plant to cause a fire or even to heat the scrap to a dangerous point. Smoking was absolutely prohibited, and only safety matches were permitted. It is possible that some foreign substance may have been gathered in with the scrap and thus caused spontaneous combustion. This latter theory is the most generally accepted one.

The heat was intense, one hundred feet being the nearest one could approach while fire was at its height. Five or six hose streams were played from a point just south of the building, when the wind suddenly changed, subjecting these men to a very intense wave of heat, and so swiftly did it come that they were obliged to drop the hose and run, all of them being more or less badly burned.

The sprinklers did very good work in helping to control the fire in this building as is shown by the fact that many boxes, benches, etc., located where the fire must have been very hot, were not even blackened. This building had recently been equipped with automatic sprinklers which were spaced three to seven feet apart on lines spaced nine feet apart. Piping was in accordance with the latest standard schedule.

S-15116. This plant was a two machine paper mill factory, using waste paper stock and pulp. The buildings were one story in height, open finish brick construction, concrete floors. Roof was slow-burning with wood sheathing, leaving eight-inch hollow space between.

Fire started at a friction clutch which became overheated (due to slipping) and ignited oil and waste paper around the paper machine near southwest corner of the room. The machine operator who discovered the fire tried to extinguish the same by means of a hand chemical. He made little headway, however, as the moving belts carried the fire to the wood sheathing at ceiling, and smoke made it impossible to stay in the building. The paper machines were shut down as soon as possible.

The night fireman was alarmed by the rapid running of the automatic fire pump, and on seeing smoke coming from the machine building he sounded the factory whistle and prepared to start the 1,000–gallon fire pump. The superintendent, who lived in house adjoining mill, responded at once and opened the two closed post indicator gate valves at south side of machine building, and started the 1,000–gallon fire pump. Employees took off five hose lines from the yard hydrants at north and south sides, and used same through windows, but these streams could not reach fire back of sheathing. Superintendent entered east end of machine building about twenty minutes after start of fire and found that the three and one-half inch riser feeding the sprinklers on the north side of the roof had been broken off. He then had a hose line brought into this east end, and by this means prevented the spread of fire to the main mill. The fire, after burning off all the wood sheathing, was easily handled and was under control within thirty to forty minutes after the start.

Sprinkler Equipment. A system of Grinnell glass disc sprinklers, mainly pendant, on old standard piping, covered entire area of the manufacturing buildings and the two storehouses. Plant was located in the country outside of public protection, but had five two-way hydrants on six and eight-inch yard loop supplied by a 1,000–gallon steam pump and a 500–gallon automatic steam pump and 500–gallon rotary pump, also a 30,000–gallon gravity tank on seventy-five foot trestle. Gravity tank was not in service at the time of fire because of repairs being made to a small leak in the yard mains. It was claimed to have been necessary to drain the tank and also the yard mains, as the post indicator valve at base of tank and the two post indicator gate valves at south side of plant could not be closed tight, so that the water interfered with pouring a lead joint. This joint was to have been poured the next morning and the tank was carelessly left in the above condition at night.

The automatic sprinklers failed to handle the fire in machine building (due in later stages of fire to the above broken riser). However, the operation of sixty-four heads in finishing building, west end, prevented the fire spreading to this building through the large unprotected doorways. All the heads in the two engine rooms at east end of machine building were opened, but it is claimed no sprinklers opened in the main mill, due to the use of hose stream at this end of machine building. The failure of the sprinklers to handle the fire at the start was apparently due to the fact that the fire spread by the belt to the broken sheathing and followed in back of same, causing sufficient heat to open a large number of heads. This sudden and heavy demand on the 500-gallon automatic fire pump overtaxed its capacity, and the gravity tank would have been very valuable as a supply before the large fire pump was started. A total of 189 heads were opened by the fire. In removing the broken sprinkler piping in the burned area, considerable sediment and several small pieces of coal were found, but it does not seem probable that any large number of sprinklers were obstructed, as the heads which opened in adjoining buildings did good service in keeping the fire from entering same.

Summary: **Large loss due to undesirable and hazardous features of hollow construction, together with impairment of sprinkler system, due to gravity tank and other fire appliances being out of service.**

S-15141. Fire occurred in a frame, metal-clad, grain elevator. The cause of the fire is unknown, but may have been due to a carelessly thrown cigar or cigarette, as considerable smoking had been reported on the wharves and on board the ships which tied up to the elevator.

The sprinkler equipment consisted of Grinnell glass disc, ordinary degree heads, on 1905 standard piping. Water supply consisted of six-inch mains with maximum pressure of about sixty-five pounds and the 750-gallon steam pump as a secondary supply.

The watchman had just made his last round in the tower of the elevator when he discovered smoke. He at once ran to the boiler house and tied down the steam whistle, thus giving a general alarm. He then started to coal up the boilers and to prime the fire pump, but by this time the smoke was so dense that it was impossible for him to remain long enough to get the pump started. By the time the firemen arrived the elevator was a mass of flames, and their attention was confined to protecting outside property. About two hours after the fire started, so many heads had opened as to seriously weaken the pressure in the mains, and the superintendent shut off the controlling valve. The fire extended to all parts of the plant and also destroyed 200,000 square feet of lumber.

The failure of the sprinklers to satisfactorily check this fire was largely due to the low pressure of six to eleven pounds on the top floors where it originally started. The elevator was covered with dust and had not been swept down that night after unloading a boat, which condition probably materially assisted the flames to spread throughout the entire tower. The dry valves were buried under a pile of debris and were found not to have opened satisfactorily.

Conclusions: This fire indicates the necessity of having a fire pump cut off from the remainder of the plant, and also the value of having a watchman thoroughly familiar with the running of the fire pump.

Summary: **Highly inflammable contents with a weak water supply.**

Fires in Which There Was Loss of Life.

These fires are intended to point out conditions under which loss of life occurs, that they may be known and guarded against.

Holocausts which are adequately reported in the daily press or are the subject of special investigation may not be given herein; nor is any complete record of loss of life in fires at present obtainable.

A workman raised the cover of a tank filled with charol, a waterproof compound containing naphtha, and lowered an ordinary incandescent lamp into the tank. The bulb struck the side of the tank and broke the filament, igniting the naphtha fumes. The force of the explosion and flames instantly killed the workman and also probably fatally injured the two other men nearby.

Electric lights in such properties should have vaporproof globes and wire guards.

Every year several fatal accidents are caused by people cleaning silk with gasoline. Many will recall from their experiments in high school physics that a good-sized spark of static electricity can be obtained by rubbing dry silk. This is what may happen when trying to rub out a spot in a piece of silk with the aid of gasoline. A spark from the silk ignites the gasoline vapor.

S-15161. A gust of air from an open window blew a piece of tissue paper into the flame of a small alcohol lamp, where it caught fire and was then blown into an open dish of gasoline used in cleaning shoes in a shoe factory. The small dish of gasoline was upset onto the floor, and a girl employee tried to extinguish the flames by stamping upon them. Her dress caught fire and she was fatally burned before flames were extinguished by wrapping her in a rug.

H-9290. Fire occurred in an excelsior works during the night while plant was shut down. Building was of the iron-clad type construction. Fire was discovered by policeman, and resulted in a total loss. Body of watchman was found several feet from a door leading to the open, and it is thought that in trying to extinguish the flames he was overcome by the dense smoke.

H-8939. Two employees entered garage to take out a motor truck. They used a lantern to see if there was sufficient gasoline in the tank. The other employees did not hear any explosion, but were first attracted by

the cries of the injured men. Both of these men have since died of their injuries. The garage was practically destroyed, but efficient work prevented the spread of the flames to any other buildings.

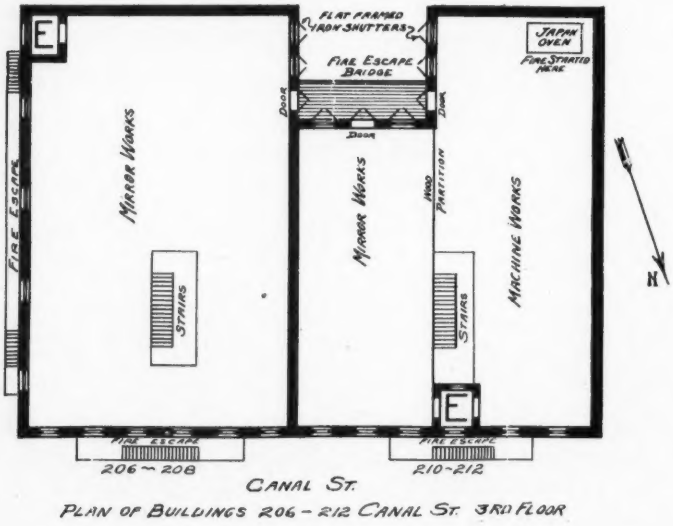
H-9341. Construction. Buildings involved in this fire were two six-story and basement ordinary brick buildings of similar construction, separated by 20–16 inch brick party wall. Area of each building, 3,750 square feet. Walls brick bearing 20–16–12 inches; front wooden show windows on first; with unprotected iron columns and girders supporting brick wall above; finish mainly open, small part plastered on wood lath. Parapets none on street, one and one-half to two and one-half feet elsewhere, including division wall through roof. Partitions wood and glass. Roof metal, joisted. Cornice metal. Skylights three on east building and four on west building, all of wired glass on metal, monitor type. Floors single, joisted on bearing walls and wood girders and posts, except cast-iron columns first floor. Ceiling open or wood sheathed. Floor openings—one flight of stairs in each building enclosed in wood hallways with wood doors. Elevator in each building in shaft of twelve-inch brick basement through roof with sub-standard metal covered doors, also wired glass in metal covered sash and frames to lofts. Small belt holes boxed through practically all floors in 206–208 Canal Street, and part of floors in Nos. 210–212. Fire Divisions—two portions of risk are separated as noted above by 20–16 inch brick wall, with shaft or pipe openings only, not close fitting. Buildings directly expose each other within twenty-five feet across court formed by extensions at rear; windows of thin glass in wood and sash with flat framed iron shutters, and wood doors with flat framed iron shutters to slatted iron bridge connecting extensions of buildings.

Occupancy. 206–208 Canal Street, basement—Italian Bank, storage of trunks and records, stock of clothing, part vacant; first—Italian Bank, stock of men's and boys' clothing, office and open stock of chairs and seats; second—manufacturer of ivory goods and hardwood specialties, stock of ivory and choice lumber (employ six to eleven hands); embossing company, preparing, embossing and dressing leather, use a mixture of their own make, a shellac and size mixture with alcohol or zapon, fifteen gallons alcohol in can, one gallon zapon, fifteen gallons shellac (employ six hands); third—mirror works manufacturing bevel plates and mirrors, five gallons each asphaltum paint, alcohol and turpentine in metal cans, four pounds nitric acid in glass, one gallon lubricating oil, good metal-lined bin for straw (employ fifteen to twenty hands); fourth—manufacturing braid (employ two to seven hands), manufacturer of picture frames, stock of mouldings and glass; fifth—manufacturing clothing (employ twenty-five hands); sixth—manufacturing pants (employ sixty to seventy hands).

210–212 Canal Street—basement—part vacant, part engine room, stock of grinding material in bags and barrels; first—open stock of clothing and merchandise, stock of buffing wheels and polishing supplies, office; second—manufacturing buffing wheels (employ five hands); third—mirror company, office and open stock of glass, machine works, manufacturing trunk

covers and other metal specialties, one coal forge, japan dipping in open tank, benzine used as thinner, claim brought into premises only as required, sub-standard japan oven, gas heated; fourth—manufacturing brass shims for automobile bearings, one carboy soldering acid (employ two hands); fifth—electroplaters, carboy each muriatic and sulphuric acid kept in front area and brought to this floor in small quantities as needed; sixth—manufacturing clothing (employ two hands).

Origin and Spread. The first indication of fire was the violent explosion of a japan baking oven in the premises of the machine works, third floor of 210–212 Canal Street. This oven was eight feet long, seven and one-half feet wide and four and one-half feet high, located in the southwest corner of the loft with doors facing the north. The oven was constructed of sheet metal on an angle iron frame. It was heated by three perforated gas pipes at the bottom, not cut off from the body of the oven, except for metal drip plate across the bottom of the oven over the burners, also a U-shaped deflector plate over each gas pipe. The oven was vented by a small iron pipe to a brick flue in the wall. A japan dipping tank, 29 x 58 x 8 inches in size, holding about fifty gallons, was located a short distance from the oven doors, and adjacent to this were racks over a drip pan for draining off the excess japan. It was customary to dip the metal trunk corners (manufactured here) in the morning, allowing them to dry in the air until afternoon when they were baked in the oven. The dipping room was not cut off from the balance of the loft; benzine was used as thinner; and it was claimed only enough was brought into loft for immediate use. Lighting of the premises was by cluster gas lamps.



PLAN OF BUILDINGS 206 - 212 CANAL ST. 3RD FLOOR

SCALE 1/16" = 1' H-9341

The oven had been lighted and material therein baking about thirty minutes when the explosion occurred. The explosion may have been due to the benzine vapor from the japan, or an accumulation of gas from a partially lighted burner, or a combination of both. The violence of the explosion is evidenced by the broken floor beams under the oven, the overturning of heavy stamping presses in front of the oven, and the blowing up of the floor boards on the story above. Evidence shows the blazing contents of the dipping tank were blown about the loft, accounting for the exceedingly rapid spread of the fire. The third and fourth floors were reported to have been a mass of flames within a few seconds after the explosion. The fire spread to 206–208 Canal Street by means of the exterior windows and doors, directly exposed across twenty-five-foot space between rear extensions, and possibly also by the unprotected shaft openings in division wall and to the upper floors of both buildings by exterior windows, belt holes in floors and the wood enclosed stairways. The fire department arrived promptly, finding the upper four stories of Nos. 210–212 and the upper three stories of Nos. 206–208 Canal Street in flames. Three alarms were turned in and the fire was fought with high pressure streams from the streets and from the rear. It is reported about twelve streams were in use. The fire was under control in about one hour and thirty minutes.

Damage. The upper four lofts and roof of 210–212 Canal Street were burned through, although the floors did not collapse. The remainder of the building below was damaged by water. This building is estimated to be about forty per cent damaged; the upper three lofts and roof of 206–208 Canal Street were burned through and the center portion of these floors and the roof collapsed. The building is estimated to be about fifty per cent damaged.

Property Loss. Stock and fixtures, in the lofts burned through by the fire, are damaged from eighty to one hundred per cent of their value; machinery in these locations are damaged from fifty to sixty per cent of their value; stock and fixtures on lower floors are damaged by water from fifty to eighty per cent of their value; small loss is estimated on machinery on these floors.

Loss of Life. Eight persons lost their lives in this fire. One employee of the machine works was killed by the explosion, and three other employees of this firm died in the hospital of burns and injuries received in the explosion. After the fire the bodies of three women and a man were found on the floor above. Hesitation and delay in reaching the fire exits probably cost them their lives, as the fire escape balconies on the outside extended in front of thin glass windows and were soon made untenantable by the fire.

Conclusions. The heavy loss of life and property in this fire shows the importance of arranging japan ovens to avoid the possibility of flame igniting inflammable vapors inside the oven. The japanning process should be segregated wherever possible, especially where a number of lives may be in danger or an appreciable property value involved.

This fire furnished another illustration of the importance of protecting all windows facing fire escapes, by wired glass in approved hollow metal sash and frames; also, the importance of having all door openings leading to fire escapes protected with approved fire doors. The balconies at the rear communicating between the two buildings at each story would ordinarily have served as an excellent horizontal exit, but were quickly made untenantable by the flames at the court windows which were provided with shutters standing open when the fire occurred.

Arcadia Hotel Fire, Boston.

One of the worst holocausts in the history of Boston took place on December 2, 1913, when twenty-eight men lost their lives in a fire in the Arcadia Hotel at 1202 Washington Street. The building was five stories in height with brick walls and wooden interior finish throughout. The only exits were a wooden stairway at the front and the fire escape shown in the photograph at the rear. The ground floor was occupied by a saloon, shooting gallery, etc., while the four upper floors were occupied as a low-priced lodging house for men. The fifth floor was one large dormitory filled with double-decked iron beds located as closely together as possible, while the lower floors were divided into small rooms by means of flimsy wooden partitions which reached part way to the ceiling. These partitions

Arcadia Hotel Fire, Boston, Dec. 2, 1913.

Fire Escapes in rear of building.

not only furnished an abundance of material for the fire to feed upon, but were in part to blame for the large loss of life, in that they greatly hindered the escape of those sleeping on these floors.

The exact cause of the fire, which started under the stairway, has not been definitely determined. The flames, aided by the draft from the street, spread rapidly up the stairways and into the different floors, which were soon a mass of fire, due to the inflammable material. It is claimed by some of the lodgers that no alarm was sounded in the building. Those located on the fifth floor were able to reach the fire escapes at the back of the building, but many in the third and fourth floors were unable to get across to the fire escapes because of the partitions and rapid progress of the flames, and as escape by the stairways was cut off they either rushed to a nearby window or perished where they stood. An alarm had called the city department, which responded promptly and did most excellent work. Many who had rushed to the windows either jumped or were overcome before the arrival of the department, although many others were saved by life nets or ladders. The actual fire was soon extinguished and did not cause a very large damage to property.

Several different investigations have been held, but other than to bring out more clearly the inadequacy of existing laws and their methods of enforcement, there does not seem to have been a great deal accomplished. The first conclusion to be drawn is the necessity of equipping such buildings with automatic sprinklers, which, even if they had not extinguished the fire, would have given prompt warning and probably held it in check until all could have escaped.

To allow buildings so constructed and maintained to be used for such a purpose is little short of criminal negligence.

H-9218. This fire occurred on the first cold night in September in a small four-room dwelling located in the oil fields. These people were furnished natural gas by the oil company, free of charge, and the piping and connections are often very faulty. This gas, either for heating or lighting, was frequently left burning at night and might go out or burn freely, depending on the varying pressure of the gas.

When discovered by neighbors, the fire had made such headway that the bucket brigade made no impression, and the house was completely consumed. The indications are that the mother may have gotten up in the night to administer to the wants of one of the children, and in doing so attempted to light the gas, which caused an explosion. The father, mother and four children were killed.

Points of Interest from Fire Reports.

These notes are intended to illustrate the efficiency or inefficiency of signaling, retardant or extinguishing agencies.

Automatic Sprinklers.

S-15040. This fire was caused by a pressing iron, left with the current on, becoming overheated. It burned a hole in the work table and ignited combustible material stored underneath. Two sprinklers located directly over work table operated and entirely extinguished the fire. The alarm was received at central station, but owing to the fact that a few minor improvements were to be effected in this service before final approval of same could be granted, alarm was not forwarded to fire headquarters, but a runner was immediately dispatched. The outside watchman being a new man had considerable hesitancy about allowing the runner to enter the building.

The damage to contents from water was considerable, due to the fact that control valve was not closed promptly after fire was extinguished.

S-15065. This fire was caused by a short circuit due to defective insulation on wires from the three-phase, 350-volt starter located in the picker room. The cotton on the floor around starter immediately caught fire and opened one sprinkler head directly overhead, which extinguished the fire.

S-14896. One sprinkler head located nearest to fire did not open. It was found covered with a coating of cotton fly and dust feltered together. This head was removed and tested in the laboratory (with this coating in place undisturbed) and the time for the head to open was three times that for a clean head of the same degree.

S-15260. Four sprinkler heads operated and practically extinguished fire. About 4,000 gallons of water were discharged from the sprinklers, showing conclusively there was considerable delay in calling fire department and closing control valve. This is corroborated by the report of the Fire Patrol, that the night employees were *locked in* and therefore could not transmit the alarm through street box and could not admit fire department promptly upon its arrival, and further that the night engineer was not sufficiently familiar with the sprinkler equipment to locate the control valve.

S-15241. Fire occurred in the one-story stone building of an oilcloth factory. The fire started in the cork dryer, probably caused by cork dust on steam coils. An explosion of gases blew the fire through the conveyor to the cork mill, in which there were sixty-one sprinklers, forty of which opened and held the fire in check.

S-15087. Sprinkler system was being installed but was not completed. Pressure tank was in service but gravity tank shut off. Fire started in rubbish in coal bunker sometime during the night and evidently operated sprinklers. Alarm system had not been connected, consequently the operation of sprinklers was not discovered until the arrival of the first man on the premises in the morning. He found fire as it was re-kindling, and summoned the fire department.

S-15057. This fire occurred in the afternoon in a carpet yarn mill and is supposed to have been due to lightning which struck the building where electric wiring entered. The lightning followed wires to hopper box, and there burst a globe. It also followed the sprinkler piping and melted sixteen heads. The fire itself did not extend beyond the hopper box, but a large loss was due to excess water damage.

S-15032. At the time of fire, water had been shut off from sprinkler equipment due to repairs being made to an eight-inch underground main. One of the leaded joints had become loose and had to be repaired. This work had just been completed when one of the workmen noticed smoke coming from the top of the building. Employees immediately ran to the cut-off valves and opened them, and turned in a public alarm. Fire department on arrival coupled to the steamer connections and pumped directly into the sprinkler equipment, and it was this supply which checked and practically extinguished the fire, as the pressure tanks with which the equipment was provided were not in service at the time, being shut off.

S-15030. This fire took place on the second floor of a pyroxylin plastic pin factory. Fire originated in one of the rounding machines and was drawn into the blower piping. Fire passed through the blower system to the detached dust house and also spread to the first and second floor of the ell of the main building. In all, eighty-one sprinklers opened on the two floors, it is said, practically simultaneously. Fire was extinguished very quickly by the sprinklers, but the dust house was totally destroyed.

S-14982. During a severe electrical storm the tower was struck and the lightning followed the roof to the two ventilators and thence to the sprinkler piping and metal work. Sprinklers opened in parts of the room remote from the fire. The water leaking through floor wet down the rooms below, spoiling cloth on the looms and loosening the leather on the rolls of the spinning frames.

S-15003. This fire, which started in a metal rubbish can, took place in the third story (occupied by a film exchange) of a fireproof building. The cause is unknown, but it was probably due to smoking, although such is denied by interested parties. When the fire started, an employee tried to

use a small hand extinguisher, but gave it up. Several thousand feet of films burned quickly and caused fourteen sprinklers to operate. The action of these sprinklers was highly satisfactory in that they entirely extinguished fire before the arrival of the fire department. Except to destroy twenty-five rolls of film, fire caused but little harm beside scorching some woodwork.

This fire brings out very clearly the great value of automatic sprinklers in such hazardous properties.

Open Sprinklers.

S-15047. This three-story brick building was severely exposed by a one-story frame building. The watchman, upon discovering the adjoining building in flames, immediately opened the three-inch valve which controlled the open sprinklers, and these successfully prevented the flames from igniting this building.

S-15121. Fire occurred in a small metal, wood frame enclosure used for receiving gauze discharged from picker in a shoddy mill. Fire flashed up while machine was in operation, and operator promptly turned water into open sprinkler line. Water distribution from open sprinklers was so prompt that automatic sprinklers did not open, and fire was entirely extinguished.

Fire Department.

S-15022. Loss was largely caused by fire department turning hose streams into the building when fire had been practically extinguished by the automatic sprinklers.

H-9256. This fire took place in an electrical repair and machine works, from unknown cause. Fire department was severely criticized, for although they had two extension trucks which would have enabled them to fight the fire directly from the floor level in which it started, they made no effort to use these but fought the fire with hose streams from the street level, and thus fire obtained considerable headway.

Three people in the burning building could have been rescued by the use of these extension ladders when the department arrived, but they were allowed to jump into the life net of the Protective Department, and one man was seriously injured by hitting a glass awning.

Supervisory System.

S-15152. The failure of the Protective Company to receive the water-flow signal until seventeen minutes after public alarm was pulled could not be explained. This failure to promptly receive such signal probably caused a much larger damage, especially from water, than would otherwise have occurred.

Private Protection.

S-15146. This property, consisting of brick buildings one to three stories in height, was severely exposed by a fire across the street in large storage tanks of oils, which was beyond control of fire department. The water and oil soon filled the streets and ran into the yard, damaging patterns and other stock. The employees dug trenches to prevent more of the oil and water from entering the yard. The fire pumps supplied by 67,000-gallon standpipe, together with 25,000-gallon gravity tank, were exhausted by employees using hose streams to wet down buildings. Some sections of one-story corrugated iron shed were badly heated and warped, a few windows broken, etc., but the fire did not get into main plant, and no sprinklers opened.

This fire brings out the great value of private protection in such an emergency.

H-9235. This fire was caused by sparks from chimney falling on shingled roof of a summer hotel. Prompt action of several employees by the use of two-inch standpipe and one and one-half inch hose, which came into the attic near where fire raged, extinguished the fire with a loss of only $150.

H-9198. Fire started early in the morning in the boiler house and gained considerable headway before being discovered by men working in the shops. An attempt was made to extinguish it with water pails and standpipe hose, but was unsuccessful, and the fire soon gained such headway that it was impossible to operate pumps.

The value of a reliable watchman is clearly emphasized.

H-9274. The exact cause of this fire was not ascertainable, but the theory advanced is that it was due to a defective bearing on elevator machinery. The property, which was used as a fertilizer factory, was nearly totally destroyed, due to the inadequate private fire protection of this plant when put to a real test. When inspector arrived at scene of fire, a stream from a 300-foot line of hose was being played on the smouldering ruins. The flowing pressure at nozzle was found to be only ten pounds per square inch.

Fire Causes.

The fires here given are selected to illustrate defects, either of construction or superintendence, in the classes of property indicated.

Cleanliness.

S-15201. This fire was due to a gas stove in a lunch room kitchen, which was covered with grease and filth, the same being ignited by gas burners in oven. Fire quickly spread to the grease on the walls, and one sprinkler head opened. Damage was slight, due to the effective work of the sprinklers.

Such accumulation of grease and filth is almost certain eventually to cause fire.

H-9212. This fire started about 6 a. m. in the ceiling above cooking range stovepipe. It was apparently put out in a few minutes with little damage; however, it must have worked its way into the attic and smouldered there for about one and one-half hours, at which time it broke out again in the kitchen. The flames spread rapidly, due to the greasy condition of the kitchen, which had at one time been used as a restaurant.

H-9130. This fire originated in smokeflue from coffee roasters and was communicated from the flue to the woodwork. The direct cause was probably due to chaff accumulations in the pipes becoming ignited through roasters.

Flues and ducts of this nature should be frequently cleaned.

Hazardous Liquids.

S-15104. Employee was draining roofing paint from a barrel, and lighted a match to see if pail was full. Vapor flashed, set fire to paint in pail and stream coming from barrel. Employee carried out burning pail of paint, falling just outside of door, and set exterior of building afire. Sprinklers prevented burning paint from setting building afire inside and fire here was extinguished by chemical extinguishers. Outside fire was extinguished by hose streams. Employee was not seriously burned.

H-9300. An accident in the chemical laboratory caused a bottle containing oil of peppermint to become broken. The fluid and vapor came in contact with the gas flame, when it ignited with a flash and communicated fire to the surroundings.

S-14979. A freight car was being loaded with automobiles in front of an automobile factory. It was the custom to run the automobiles into the freight car under their own power and then draw off the gasoline. In the absence of the man who regularly attended to this work, another employee went into the car with a lighted lantern to draw of the gasoline. This had already been done, resulting in the gasoline, which was in an open pail, becoming ignited as soon as the lighted lantern was brought within range of the fumes. The employee was considerably burned, and three automobiles were destroyed.

H-9206. This building was used for the storage of rubber cement, alcohol, benzine, etc. There was also a large iron, steam-heated kettle at the west end where a waterproofing compound of benzine, rosin and wood alcohol was mixed. A large kettle of this waterproofing compound had just been mixed and doors opened to allow the fumes to escape, when there was a sudden flash of fire which shot back to this building. Investigation indicated that these fumes coming from the building were ignited by a bonfire a considerable distance away, at which refuse was being burned.

H-9188. In this varnish factory pots in which linseed oil is boiled are brought direct from furnaces to thinning room in which there are numerous tanks of turpentine and benzine. Fire originated at a pot which had just been brought from furnaces and placed in northwest corner of room. It is thought that the heat in bottom of pot was higher than the flash point of benzine vapors in room, thus igniting same.

S-14919. Proprietor of a raincoat factory was thinning rubber cement with benzine, and at the same time was smoking a cigar. Although badly frightened he was fortunately not seriously hurt.

Considerable water damage was due to the Salvage Corps being misdirected by the central alarm station, and arriving late.

S-14929. About 10.30 p. m. a fire occurred in the shipping and stripping room on the second floor of main mill of a silk manufactory. The watchman wishing to clean an alarm clock went to this room for some gasoline. He was filling an ordinary tin pail, and to expedite matters removed the top from the safety can. The vapor from the gasoline ignited by his lighted lantern, badly burned him and set fire to stock. One sprinkler opened and extinguished the fire. The loss was about $2,000, due to water damage to finished stock.

H-9268. Fire was caused by an employee making a mistake in pouring gasoline into radiator of automobile, the fumes being ignited by coming in contact with lights on the car. Loss $24,000.

H-9226. Cause of this fire is described as being due to gasket blowing out in pipe line conveying creosote vapors to condensor, permitting these vapors to become ignited from a boiler located twelve feet away from the break.

S-15005. A man employed at the cement house attempting to turn on faucet to a drum of carbon bisulphide, broke it off at the drum, allowing the liquid to run onto the floor; and as the man jumped to get something with which to plug the opening in the drum, he was enveloped in a sheet of flame, the liquid on the floor having ignited. Just what caused the liquid to ignite is not known, but it is supposed that in his rapid movement to get something to plug the drum, a nail in his shoe struck a spark on concrete floor.

The man who was drawing the liquid and another employee were badly burned about the feet and hands.

In the oil room at the time of fire were small tanks of oil, rubber cement in tubes and cans, also safety cans for transporting naphtha and benzol into the factory.

The window frames and sash in oil room were badly damaged, but prompt work by the employees in closing the fire door prevented spread of the flames.

Lighting.

H-9321. This fire took place in a three-story brick building occupied as a retail dry goods department store. On this night there was some trouble at the electric light plant at 9 p. m. and the lights all over the city were out for a short time. During this time several candles were used in various parts of the store. When the electric lights came on, all of these candles were supposed to have been gathered up and put out, but one of them was apparently overlooked. The store was closed later for the night and about 2.30 a. m. fire was noticed by some people passing in the street. By that time fire had gained such headway that it was impossible to save anything in the building. Very effective work by the city fire department prevented the fire from spreading to surrounding buildings. The total estimated loss was $135,000.

S-15011. Fire started with a flash when the engineer entered the fly wheel pit with an open torch to examine a steam siphon, and it is supposed to have been caused by accumulated oil vapors, the oil and grease in the pit being heated by the steam siphon.

S-14970. Third floor of this building was used in part for the storage of stitched embroideries in the gray. These gray goods were stored in open cases on their sides one above the other. Some boys had put some material on top of the upper case and completely covered a five-cluster incandescent light. In about an hour after they smelled smoke in this material. Prompt discovery of the fire confined the loss to that involved in the goods stored nearby.

S-14906. Engineer used an oil torch light in inspecting oil cups on the engine. In this particular case he set the oil torch on the floor at the edge of the wheel pit while oiling the bearings of the wheel. In stepping back he struck the torch with his foot, overturning same into the wheel pit,

which contained a considerable amount of lint, sweepings, etc. The light, falling into the pit, struck the wheel, and oil was dashed over the room. Prompt action by thirteen sprinklers opening extinguished the fire before any serious damage had taken place.

S-15206. Fire was caused by watchman's lamp exploding and setting fire to his clothing. As he happened to be located directly under a sprinkler head, which promptly opened, the damage was slight, although he was badly burned.

Power.

H-9095. Fire caused by overheated journal was discovered by assistant engineer of plant on the first floor of sawmill. Oil and sawdust on bearing had ignited and was dripping fire or sparks into sawdust on floor. When the assistant engineer located the small blaze he immediately secured a pail of water and dashed the water on the flame with such force that the surrounding sawdust was blown about and a dust explosion quickly followed. The result was that the fire rapidly spread throughout sawmill and was soon beyond control, as no efficient private protection was at hand with which to fight it. In an incredible short space of time the sawmill was a mass of flames, the combustion being fast, and immense volumes of gas were thus generated. At the time of the beginning of the fire and throughout the conflagration, there was a strong wind blowing from the northeast and north, which was the cause of the ignition and destruction of the buildings lying to the south and southwest of sawmill.

The local volunteer fire department was greatly handicapped by poor water pressure, for when the hose lines were laid it was found that the water pressure was so poor that streams of water could not be thrown to a greater distance than about twenty feet from the nozzle tips, the nearest available city hydrants being 450 to 800 feet distant from the burning plant.

S-14883. Fire was caused by loose pulley of shafting not being properly oiled. Friction of pulley and shaft set fire to shavings and sawdust on the machinery, walls and floor in this vicinity.

H-9115. Fire was apparently caused by a hot box in shafting of motor-driven ventilating fan located in roof of punching shop. When first noticed, sparks had ignited the woodwork nearby. Loss was slight, due to prompt discovery.

Electrical.

S-14898. Smoke was noticed coming up through the second floor of office building, and it was found that the fire had been caused by an electric light wire being in contact with some plumbing pipes. Some plumbing had recently been done and apparently the plumber found that certain wires were located where his pipes were to go, and so he spread the two wires admitting the pipes between them.

H-9141. Fire was caused by a defect in the automatic switch located in a motion picture booth. The switch become overheated, and being located in a wooden cabinet lined with tin, the continuous heat penetrated through to the wood and to the wire lathing, heating the latter, which set fire to a large exposed roof girder immediately above the booth, and extended up to the space between the ceiling and the roof, where evidence showed that the fire had burned for a long time before discovery from the outside. The booth remained intact, leaving the switch with evidence of its failure and overheating. The roof and girders were destroyed and the metal ceiling was pulled down by the firemen.

S-15183. At night when the factory was shut down the main switch in the basement was opened and the starting boxes at the various motors were relied upon to release when current was apparently shut off. An employee on each floor was supposed to see that starting boxes had released, before leaving at night. In the morning when the engineer threw in the main switch, one of the motors on the fourth floor started under full current, as the lever of the starting box of this motor had not released when apparently shut off the night before. The motor sparked excessively and ignited some lint near the motor box.

S-15038. This fire was caused by an overheated electric pressing iron, due to failure of the operator to turn off the current when stopping work at night. The iron was placed on a one and one-half inch metal stand on a cloth covered table, and was provided with separate fuse, switch and pilot lamp. After the fire it was found that the pilot lamp was burned out, and it is supposed that the pilot lamp may have been burned out before fire started and the operator did not therefore notice that the current was on.

Construction.

H-9326. A new tobacco warehouse, open joist construction, brick and concrete side walls and metal roof, was exposed by a burning stable of frame construction. The warehouse was not provided with shutters or wired glass windows. The fire spread rapidly through the warehouse windows and resulted in a total loss.

Wired glass windows or shutters should be installed under such circumstances.

H-9125. This fire took place in a brick constructed hardware store. The large loss of $46,000 was in part due to the ease with which the fire spread through open elevator shaft.

S-15058. This fire took place in the shavings vault adjoining the boiler room. The shavings vault and boiler room were constructed of brick with corrugated iron on steel beams for the roof. The partition wall between the boiler room and the fuel vault was constructed of brick, but a portion of this wall at the bottom was found to be one side of the boiler setting for the boilers in the boiler room adjoining. Owing to trouble with the boilers, the particular one adjoining this partition was being forced at the time of

fire, and the setting became so hot as to ignite the shavings stored on the other side of it.

H-9293. Fire evidently started in corner near gas main, for at this point three floor beams were burned through. Considerable trouble was experienced in turning off gas, as piping connection to the meter was made by soldering. The fire melted this solder and allowed the gas to pour into the room.

S-15123. Fire originated between the tile ceiling above the boiler room and the wood floor. It was caused by the wooden two by four inch sleepers, laid on top of the six-inch tile, becoming ignited from the heat from boilers and breeching. The breeching and boilers were from six inches to two feet below the ceiling.

Miscellaneous.

H-9311. Fire was caused by lightning striking a 37,000-gallon crude oil tank. This tank was sub-standard in that it had a wooden roof and stairs, and was partly wooden on the inside. The dike about the tank was only three-fourths the capacity of this tank, thus permitting the oil to overflow and ignite several nearby buildings. The firemen misjudged the capacity of this dike, and several men had very narrow escapes from being burned by the oil. Loss $40,000.

H-9199. This fire, which took place in the kiln shed of a pottery, was due to the hot blast from the kilns occasioned by the burner shutting off the damper which checked the down draft and thus sent the current of air up through the coal openings in the upper part of the kilns close to the overhanging roof, which communicated the fire to the same.

H-8959. This fire occurred on the second floor of a brick building occupied by a manufacturer of automobile tops. The building was without any protection, and the fire was discovered from the outside by flames issuing out of a dome skylight at the extreme rear. By the time the firemen arrived the fire had assumed great headway, largely due to the presence of a considerable lot of celluloid in the form of large sheets which gave off volumes of gases when attacked by the heat, but the vent from the dome and broken windows apparently prevented an explosion. The fire was cut off in the front by fire doors which satisfactorily withstood the test. Efficient work of the firemen prevented the spread of the flames. Loss $9,570.

S-15100. Fire occurred in the opener room of a cotton mill, probably due to a spike or piece of wire in the cotton. Stock was blown by a fan, and at the time fire occurred a mixture of cotton and waste was being put through. The first indication of fire was when employees noticed smoke coming from the bin to which the stock was being delivered. The cotton in the bin was ignited, and although the employees tried to close the swing door on the bin the amount of stock on floor prevented them from closing it tight, resulting in the fire spreading to the hoppers of the three picker machines.

Standard Rules and Requirements

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